

(E83-10269) THEMATIC MAPPER FLIGHT MODEL
PRESHIPMENT REVIEW DATA PACKAGE. VOLUME 4:
APPENDIX. PART E: ELECTRONICS MODULE DATA
(Santa Barbara Research Center) 300 p
HC A 13/MF A 01 CSCL 14B G3/43

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BECDARD SPACE FLIGHT CENTER Grandbok, Maryland 20771 CONTRACT HAS 8-24200

PART E - ELECTRONICS MODULE D

Article IV - 3A

HUGHES

NUGHES AIRCRAFT COMPANY

Article IV - 3A

FLIGHT MODEL PRESHIPMENT REVIEW DATA PACKAGE VOLUME IV APPENDIX

SEPT 1982

PART E | ELECTRONICS MODULE DATA

Prepared for GODDARD SPACE FLIGHT CENTER Greenbeit, Maryland 20771 CONTRACT MAS 5-24200

THEMATIC MAPPER

HS 236-0019-1679

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Appendix E

Electronics Module Performance Data

Part 1

Pre-Integration Test Data

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MODEL REVISIONS					
EFFECTIVITY	SYM	DESCRIPTION	DATE	APPROVED -	
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JUMPER ACROSS RADIONIFOR - SY MAST CLARA OUT BIX JACKS 1-5, 1-10.

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TOT 114, 11 1.23.9.20

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MEASURE STURDY STATE EMB 3 +19 V AT 3-22 15: MEASINE ETTY)Y STATE BAND 3 494 AT 3-21

P-SA 4.23.9.26

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DESCRIPTION OF CHANGE						
1) PARA 4.21.10.2.5 S	SYS CHECK DC RESTORE	ON/CAL SHUTTER NORMAL				
PROCEDURE STE	0	SPEC				
IS Verify that the DV	M is measuring 2 1.45 volts	, ≥ 1.45 valts				
(Note P13 must be Test Panel for this	M is measuring 2 1.45 volts disconnected from multiplexer ai check)	nd connected to Function				
1	M is measuring 2 1.8 volts	≥ 1.8 volts				
, ,		AL SHUTTER BACKUP SELECT				
PROCEDURE STEE	> -	SPEC				
IS Verify that the DVN	1 is measuring ≥ 1.45 volts	≥ 1.45 volts				
(Note P13 must be	disconnected from multiplexer	and connected to Function				
Test Panel for this check)						
! .	M is measuring 2 1.8 volts	1				
3) PARA 4.21.1446 SYS CHECK/FRAME DC RESTORE SELECTED						
PROCEDURE STEP		SPEC				
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(Note PL3 must be di Test Panel for this t	sconnected from multiplexer and heck)	nd connected to Function				
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4) FIGURE 4.12 a Main Shutte	er Timing					
/		<i>J</i> 20-23				
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PARA 4.8 5.5 DC RESTOR	RE/CAL SHUTTER SEN	ISOR B			
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WAS Verify that the DVM is	s measuring 2 1.8 voits	•	≥ 1-8 v	10145	
PARA 4.13.7.6 TELEMETR	Y SCALING/FRAME D	C REST	ORE SELECTE	D TEST	
PROCEDURE STEP	•		SPEC		
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- 3.4.2 Ground Isolation
- 3.4.3 Power to Ground Anti-Continuity

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3.4.4 Power Distribution

4.0 DETAILED FUNCTIONAL TESTS

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- 4.19 Post Amp Tests
- 4.20 Mux Handshake
- 4.21 Mechanism/Controller Rechecks System Configuration

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4.22 Ambient Board Temperature Checks

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- 4.23 Power Supply Handshake
- 5.0 QUALITY ASSURANCE PROVISIONS
- 6.0 FREPARATION FOR DELIVERY

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1.0 SCOPE

This test verifies the as designed performance of all circuits within the Electronics Module Unit. It is to be conducted prior to mating with the Aft Optics Base Assembly, the Radiative Cooler Unit, the remote sensors and RC door actuator, and the Scan Mirror Assembly. Successful completion of this test will constitute an acceptance of the Electronics Module.

The completely assembled Electronics Module is cabled to the Electronics Module Test Set which provides input power, command inputs, clock and drive sync signal inputs, and simulated Video Sensor preamp inputs. The test set also provides loads for all remote telemetry sensor inputs to the electronics module, motor loads, and all other loads including heaters, RC door actuator and fusible links. A test program will be performed semiautomatically by the module test set under microprocessor control to verify the telemetry and command functions. The electronics module test data are printed out by the test set printer and displayed on the test set monitor. The data must be scanned manually against specifications listed for each test performed.

The following electronics module circuit functions will be performed:

- The power supply voltages and currents will be recorded for each board connector at several stages of turn-on and the data compared with specification limits or expected values as appropriate.
- 2) All commands (except multiplexer) will be executed and verified where internal to the Electronics Module; where commands are external to the Module, command lines will be verified.
- 3) All telemetry will be checked for correct command status, correct temperature voltage and status where telemetry is wholly within the Electronics Module.
- 4) All temperature Controllers will be exercised against equivalent heater loads and sensors with response and temperature stability verified.
- 5) The shutter motor drive circuits will be exercised with motor simulation circuits and resonant shutter simulation circuits. The circuits' closed loop performance will be observed along with the drive pulses, and error signals.

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- 6) The Scan Line Corrector drive circuit will be interfaced to an SLC Simulation circuit: both SLC and drive wave form will be observed.
- 7) The RC door actuator wave form will be checked against a resistive load.
- 8) All 100 video channels will have simulated preamp signals injected at the several band post amplifier inputs. Gains, offset voltages and noise voltage levels will be recorded for each channel and compared with specification performance requirements.

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2.0	APPLICABLE DOC	UMENTS	(IDIOINAL DAGE 10
2.1	Government Doc	uments - None	ORIGINAL PAGE IS OF POOR QUALITY
2.2	SBRC/KAC Docum	ents	
	TP32015 - 500	System Test Plan	
	356938	Mapper System Electric	al Interface Definition
	52347	Electronics Module As:	sy Thematic Mapper
	52348	Assy, Cable Routing Ti	nematic Mapper
	75572	Cable Diagram - Themas	tic Mapper
	50901 - 5090	0 AlO-Serial Magnitude (Command
	50905 - 5090	4 A18-A21-Post Amps Band	is 1-4
	50909 - 5090	8 Al5, Al7-Post Amp Band	5 and 7
	50913 - 5091	2 Al6-Post Amp Band 6 as	nd Relay
	50917 - 5091	6 A6-Cal Shutter Main	
	50921 - 5092	C A5-Temp Control/DC Res	store Control
	50927 - 5092	6 A3-Cal Lamp and Inchwo	orm .
	53878 - 5387	7 A9-Motor Drive	
	50943 - 5094	2 A4-Temp Controller	
	50949 - 5094	8 All-Verification Regi	ster
	51399 - 5139	8 A7-Cal Shutter Backup	
	51403 - 5140	2 AS-Telemetry Scaling/	Baffle Htr
	51796 - 5179	5 All-All-Macro Discrete	e Cmd Gen No. 1
	51814 - 5181	3 Al4-Macro Discrete Cmo	d Gen No. 2
	52251 - 5225	0 Al, Al-Scan Line Corre	ector
	52798 - 5279	7 A22-Auxiliary Circuit	Board
	52923	A25-Terminal Board	
	52930	A23-Capacitor and Rel.	ay Board

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A24-Terminal Board

3.0 TEST REQUIREMENTS

3.1 General

All tests will be performed in a clean room environment under ambient temperature and pressure.

3.1.1 Test Description and Configuration

All 22 PWBs will be tested by plugging the PWBs into the Electronics Module PWB connectors provided. The Test Set will provide power, signal and command inputs, and will also provide any output loads. The microprocessor program will send commands where required, inject preset signal levels and printout response data and telemetry where applicable. By function these separate tests are:

- 1) Scan Line Corrector Driver Apply input power; check regulated buses; apply SLC sync signal. Turn-on; check sync vs Motor Drive and Tachometer feedback signals for proper phasing.
- 2) Shutter Drivers Function Test:
 - a) Cal/Restore Shutter: A simulated shutter load will provide response, supply 7 Hz and 102 kHz sync signals; check for response phase lock and jitter; check for output drive signal parameters.
 - b) Back-up Shutter: same as a).
- 3) Cal Lamp Controller Function Test Use lamp loads; check lamp current, lamp stability, and sequencer for 7 separate lamp radiance levels. Check all telemetry outputs.
- 4) Post Amplifier Function Test Each band PWB post amplifier board will be checked separately with a standard input signal for gain, D.C. offset, noise and bandwidth.
- 5) Command Decoder Verification Unit (CDVU) A special subassembly test setup will simulate the Spacecraft Remote Interface Unit (RIU). Under microprocessor control, all valid bit patterns will be applied to the three functional entities of the CDVU, namely the "Command Receiver/Decoder," the "Verification Unit," and the "Macro-Discrete Command Generator." In this test all discrete (relay), macro-discrete, and digital commands will be exercised, and execution verified

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where valid command relays are energized. In addition, proper command line state at power turn-on will be verified.

6) Temperature Controllers Function Test - The controlled heaters tested include the telescope baffle heaters, calibration black body heater, RC intermediate and Cold Stage Heaters, Scan Mirror Assembly Heaters, and the Vernier Focal Plane Heater. All heaters will be energized one by one, the temperature and telemetry will be verified for error, and the heater currents measured. In the case of the calibrator black body, both temperature levels will be checked. Heater controller back-up modes will be tested.

7) Actuator Controller Function Test:

- a) Inchworm Logic will be tested for direction of travel, step command execution, and verification telemetry.
- b) Linear Variable Differential Translator (LVDT) Test will simulate load and drive output, and check output voltage.
- c) Radiative Cooler Door Motor Test will command direction OPEN/CLOSE; command MOVE; check output waveforms, check time-out delay (time to open or close).
- d) Cooler Door and Main Shutter Fusible Links Test will include command ARM 1, ARM 2, and ACTUATE; output.
- e) D.C. Restore Shutter D.C. Restore input signal will be simulated; output response voltage will be checked; telemetry will be checked; the test will also be repeated for back-up mode.

3.1.2 Data Acquisition and Reduction

Test Set Microprocessor will print out and/or display command and telemetry. All the other data will be taken either from displays or by measuring equipment connected to the Function Test Panel. Data will be compared with specification limits established for each test.

3.2 Test Equipment (or equivalent):

Electronics Module Test Set with (NAS 5-VOR1-C):

Command and telemetry generator fincluding Texas
 Instruments Silent 700 Printer and Sony 7ideo monitor.

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2) Power Source and Functional Load Simulator.

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- 3) Required electronics Module and equipment mating cables.
- 4) Extender cards, Assy. 76400.
- 5) Module Cable breakout boxes, Assv. 335499-2
- 6) PWB Extractor, Assy. 76447

3.2.1 Commercial Test Equipment

Storage Oscilloscope, Tektronix 7633 with following Tektronix plug-ins:

7A22 preamplifier (differential)
7A26 preamplifier (dual trace) - qty. 2
7B53A time base

- 2 Voltage Reference, Power Design 2005 qty. 2
- 3) True RMS Meter, HP3400A
- 4) Digital Multimeter, Fluke 8030A
- 5) Temperature Sensor, Fluke 80T-150°C
- 6) Pulse Generator, Datapulse 110B
- 7) Function Generator, HP 3310A
- 8) Current Probe, Tektronix P6042
- 9) Decade Resistor Box

Cornell-Dubilier RDA 1-110 ohms Cornell-Dublier RDC 10K-1100K ohms Ohmite 9401 100-999,900 ohms

3.3 TEST CONDITIONS

3.3.1 Static Sensitive

The subassemblies shall be handled in accordance with SBRC SP80113 to protect the static sænsitive assemblies and components. A wrist stat shall be worn when installing and removing any subassemblies from the modulæ and when handling the Electronic Module Assembly.

3.3.2 Cleanliness

Clean conditions apply to all Protoflight and Flight subassemblies. In addition, a dust cover shall be placed over the Electronics Module Assembly whenever it has not on a flow bench.

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3.3.3 Visual Inspection

All subassemblies shall be inspected for missing select components and jumper wires; that each board has been tested per its AHRS; and that the connector pins are straight and clean. The mating connector in the module shall be checked for alignment and lack of damaged pins prior to each insertion of the correct PWB assembly.

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3.3.4 Extender Cards

Only extender cards Assy 76400 shall be used on the Electronics Module assembly.

Prior to use, each connector on the PWB. Extender Card and Electronics Module shall be visually inspected for lack of damaged pins and that sockets/pins are free of debris.

3.3.5 Installing PWB Assv AlAO1 through AlA22

- 1) Verify that power is off and that wrist stat is worn.
- 2) Verify connector pins for alignment and cleanliness.
- 3) Verify correct PWB orientation and verify that PWB is being installed in the correct slot. Each slot has special keying to prevent incorrect PWB insertion.
- 4) Insert board until connector pins are engaged. Verify that both sides of the connector are properly mating.
- 5) Apply even pressure on the edge of the board to engage connectors. If board does not begin to engage easily, recheck connector alignment. Do not force the PWB into its connector!

3.3.6 Removing PWB Assv AlAO1 through AlA22

- 1) Verify power is off and wrist stat is worn.
- 2) Connect flight PWB card extractor tool Assy. 76447 to PWB.
- 3) Using tool handle, evenly pull board from module connector.
- 4) Visually inspect the PWB, extender and module connectors to verify that each pin was not damaged.
- 5) Place PWB in clean storage bag and remove extractor tool. Place PWB in carrying box and return it to its flight storage location.

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3.3.7 Module Test Set

The Electronics Module Test Set is to be used to insure proper operation of the TM Electronics Module as a complete unit and as an aid in troubleshooting. The EM test set provides four main functions:

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- 1) Issue and verify commands to the TM Electronics Module.
- 2) Read telemetry status from the TM Electronics Module.
- Provide dummy loads and mechanism simulation of thermistors and radiometer hardware.
- 4) Provide a secondary power source for the voltages needed by the TM Electronics Module in place of its own power supply.

3.3.7.1 Major Components

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The Test Set is comprised of seven major modules or units:

- 1) A Motorola 6800 micromodule µP system consisting of a 6800 CPU board, 3K of RAM, up to 20K of EPROM, and 2 each, 64-channel A/D converter boards for reading analog telemetry. The 6800 CPU is the control center for operations and functions of the test set.
- 2) A TI Silent 700 teletype terminal. This terminal provides the only communication between the operator and the test set except for the power switches on the different units. The terminal can provide a hardcopy printout of the various functions and operations of the test set.
- The Augat Interface Box allows the microprocessor to communicate with the TM Electronics Module. It provides all the various clocking and timing signals used by the Test Set to communicate to the Electronics Module. It provides all the circuitry for changing the microprocessor data into the correct format for talking to the Electronics Module and vice versa. It looks like an RIU to the Electronics Module.
- 4) The two Power Supply Modules prowide all of the voltages needed by the TM Electronics Module. Each of these P.S. modules is comprised of several open frame power supply units that have overwooltage protection and foldback current limiting. Each of the P.S. modules has test points for monitoring their output voltages on their front panels.

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- 5) The color CRT display provides a visual indication of system status for the operator.
- 6) The Telemetry/Command Interconnection Box provides the wiring links between the Augat Interface Box and the Electronics Module, including zener diode protection on all analog telemetry lines.
- 7) The Function Test Panel contains dummy radiometer loads and simulators. It has two built-in decade counters for thermistor simulation, and test points for monitoring or simulating functions of interest.

3.3.7.2 Turn On/Off Procedure

All power switches on the E.M. Test Set should be at the "OFF" or down position before proceeding further with the turn on procedure. If the harness/module unit under test has not been mated with the Module Test Set previously, carry out the prepower tests in 3.4 before proceeding further.

- Verify that all interconnecting cables are connected per drawing 76813.
- Connect the Test Set main power receptacle on the lower left side of the Cabinet to 60HZ, 115 VAC.
- Connect the cable harnesses between the E.M. Test Set and the TM Electronics Module.
- Turn on the main power switch on the EM Test Set. CRT power will come on. The video enable switch is on the CRT panel.
 - 5) Turn on the T.I. Silent 700 terminal by pushing the switch on the right rear deck of the terminal toward the rear.
 - 6) Turn on the Augat Interface Box with the switch located on the back connector panel.
 - 7) Turn on the circuit breaker switch on the 6800 Microprocessor front panel. The terminal should print the word "MONITOR".

NOTE: The pushbutton switch on the front panel of the microprocessor is the "RESET" switch. Pushing this switch at any time will return the microprocessor to "MONITOR" mode. The MONITOR mode is the main executive (or operating) program in the computer. All modes of operation are called from this program. Also pushing the "ESC" (escape) key or the "RETURN" key will

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usually return the computer to the MONITOR mode.

- 8) To turn off the EM Test Set follow the reverse order of the preceding steps.
- 9) For further information on operating E.M. Test set hardware see Procedure 16927.

3.3.8 Module Test Set/Software Operation

There are three basic modes of operating the E.M. Test Set:

- 1) Issuing Commands
- 2) Reading Telemetry
- Specialized Test Programs, which are usually a combination of the first two.

3.3.8.1 Issuing Commands

Issuing any one of the three types of commands is accomplished in the same basic manner.

The HEX Cmd. No. (corresponding to command operation) is keyed into the terminal, then the return key is pushed.

There are two modes for issuing a single command:

"C" Mode

A "C" is keyed in, then the terminal responds with "CMD=", then the operator keys in the HEX Cmd. No. After an approximate one second delay, the terminal will respond with "CMD=". The terminal is now ready for the next command number.

If the terminal responds immediately after pressing the return key with "CMD=" (no one second delay) an invalid command number was used. Also, certaim commands are considered critical commands and the computer will prompt the operator with a message asking if he is sure of the command number.

"V" Mode

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The "V" mode is identical to the "C" mode except that in addition this mode verifies that the command was actually accomplished by reading back the telemetry. If it does not verify the terminal will print "VERIFY FAILS" then "CMD=" and wait for the next command.

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3.3.9.2 Reading Telemetry

Of the three types of telemetry signals, only the serial telemetry and the analog telemetry signals are monitored by the E.M. Test Set.

1) Serial telemetry corresponds to words A through M. Words I and J echo command telemetry for the Serial Magnitude Commands. Word K is associated with the SMA. The telemetry words are received as 8 bit words and are printed out as two HEX digits. If the video is enabled serial telemetry words A-L are displayed on the CRT in a matrix format. The video display is updated every time a "C" command is issued.

To check the telemetry status before any commands are issued or when the video is disabled, key an "S" on the terminal. The computer will respond with "WORD, BYTE=?". Then key in the word letter and data byte of interest, followed by "RETURN". The computer will print out the data byte read from the TM Electronics Module.

2) Analog telemetry signals are a voltage level between OV and 5.12V. These signals are processed by an 8 bit A to D converter and the value displayed or stored for later use. The analog telemetry mode is entered by keying a "T15" then "RETURN" on the operator's console. The display is cleared and initialized for analog mode and the following prompt will appear (note that all prompts will be sent to the printer and not to the display CRT):

a) Select Display Position

The operator will position cursor on the left margin of display to the desired line (one of seven) using CRTLN for cursor up and CRTLV for cursor down. Once the desired line is selected, enter "RUBOUT".

b) >CH#, FUNCTION, UL, LL

The operator now enters a two digit decimal channel number, a functional description of the channel (up to 16 digits), and - if desired - upper and lower allowable readings. If upper and lower limits are not desired, enter "RETURN" immediately following the description.

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Example of entry with limits:

>23, CFPA TLMY, 4.123, 1.00 (RETURN)

This will activate channel 23 and flag limit violations for any value above 4.123 volts and below 1.000 volts.

Example of entry without limits:

>23,CFPA (RETURN)

This will activate channel 23 and will not flag limit violations.

In either case, once "RETURN" is entered. the channel number is checked for validity. If determined valid, the channel number and description is displayed on the CRT on the line selected in step a.

c. > ANOTHER LINE?

At this point the operator has the option of adding another display line to the CRT display. If so desired, enter "Y" and control will be returned to step a. Enter "N" and control will be transferred to step d.

- d. At this point nothing is printed on the terminal, and the analog read loop begins. All channels selected above will now be read and their values displayed on the CRT. Upper limit violations (if enabled in step B) will be shown as an inverted (reverse color) space immediately to the left of the most significant digit of the reading, and lower limit violations will appear as an inverted space immediately to the right of the least significant digit of the reading. The processor will remain in this mode, reading the requested analog channels and updating the display, until one of two things happen:
 - 1) An "ESCAPE" is entered, at which point control is transferred to step E.
 - A "SPACE" is entered, at which point control is returned to step A.

e. > HARDCOPY?

The operator now has the option of

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having a hardcopy of the CRT display. This is accomplished by entering a "Y". If any other key is pressed, control is transferred to "MONITOR".

3.3.9.3 Test Programs

There is a maximum of 13 test programs which can be made available. The test programs are called by keying in "TXX" where XX is the two digit test program number, and then the "RETURN" key. Test Program #1 prints out a description of each test program that is stored in memory.

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DATA SHEET NO. 1 OF 3

PARAGRAPH NO. 4.20.

DETAILED FUNCTIONAL TESTS

PROCEDURE STEP Sultiplexer Initial Check and Handshake hut off Multiplexer Interface Power at uxiliary Panel of Test Set. hutdown all Module simulated powerforms t the Power Distribution and Bus Power anels of test set. emove connection between Multiplexer imulator and mating connector to outtiplexer J? connector. nstall multiplexer into module and mate	SPEC	RECORD DATUM / VERIFY	
hut off Multiplexer Interface Power at uxiliary Panel of Test Set. hutdown all Module simulated powerforms to the Power Distribution and Bus Power anels of test set. emove connection between Multiplexer implator and mating connector to all tiplexer J2 connector. nstall multiplexer into module and mate			
hutdown all Module simulated powerforms to the Power Distribution and Bus Power anels of test set. emove connection between Multiplexer implator and mating connector to all tiplexer J? connector.		<u> </u>	
t the Power Distribution and Bus Power anels of test set. emove connection between Multiplexer imulator and mating connector to ultiplexer J3 connector. nstall multiplexer into module and mate			()
imulator and mating connector to ultiplexer J3 connector. nstall multiplexer into module and mate		/	
	l .		(1)
11 interfacing connectors.			(5)
ate breakout boxes to multiplexer J2, J3, nd J4 connectors and mate Scan Mirror lectronics simulated signals from test et to multiplexer J13 connector.			(1)
nable all module simulated powerforms at he Power Supply panels and apply power to ultiplexer Interface at Auxiliary Panel f Test Set. Set SME select to position 1.			(~)
xecute command:	_	/	
MULTIPLEXER ON (POWER SUPPLY 1).	5		(V)
ith signal return at J4 pin 60 connected o DVM return, verify the following elemetry points then the DVM (+) input is onnected to the specified points.			(5)
and 1 Reference I/-1	1.94<∇<2.06	1003	AEC
x i o e o	ecute command: MULTIPLEXER ON (POWER SUPPLY 1). ltiplexer Internal Telemetry Check. th signal return at J4 pin 60 connected DVM return, verify the following lemetry points then the DVM (+) input is	ecute command: MULTIPLEXER ON (POWER SUPPLY 1). 1 tiplexer Internal Telemetry Check. th signal return at J4 pin 60 connected DVM return, verify the following lemetry points then the DVM (+) input is nnected to the specified points.	ecute command: MULTIPLEXER ON (POWER SUPPLY 1). 1 tiplexer Internal Telemetry Check. th signal return at J4 pin 60 connected DVM return, verify the following lemetry points then the DVM (+) input is nnected to the specified points.

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E. M.	MODULE	UNIT	TEST	A	11323	NUMBER	16704
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PARAGRAPH NO. 4.20

DETAILED FUNCTIONAL TESTS

		LOG A	HR OPER	7 1500
PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(2.1)	Band 2 Reference J4-3 Band 3 Reference J4-5 Band 4 Reference J4-7 Band 5 Reference J4-9	1.94 <v<2.06 1.94<v<2.06 1.94<v<2.06 1.94<v<2.06< th=""><th>1997</th><th>VDC VDC VDC VDC</th></v<2.06<></v<2.06 </v<2.06 </v<2.06 	1997	VDC VDC VDC VDC
	Band 7 Reference J4-11 +18.8V Power Status J4-17 +5.2V Power Status J4-18 -2.3V Power Status J4-19 -5.2V Power Status J4-20	1.94 <v<2.06 4.05<v<4.75 4.05<v<4.75 3.80<v<4.20 4.05<v<4.75< td=""><td>4.30 434 397 448</td><td>VDC VDC VDC VDC</td></v<4.75<></v<4.20 </v<4.75 </v<4.75 </v<2.06 	4.30 434 397 448	VDC VDC VDC VDC
2.2	With DVM (+) and return inputs connected to specified inputs record the following telemetry points: DVM(+) Power Supply Temperature J4-51 J4-52 Garages, a. Electronics Temperature J4-46 J4-47 Canvars, a.	4.05 <v<4.75< td=""><td>116KA 1.17KA</td><td>مهر الم</td></v<4.75<>	116KA 1.17KA	مهر الم
2.3	Power Supply Input Current J4-55 J4-56 Midscan Pulse Telemetry Check. Execute command: MIDSCAN PULSE DISABLE A MIDSCAN PULSE DISABLE B	. 84	4.06	1 Amp/ Volt

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E. M.	MODULE	UNIT	TEST	Size	11323	NUMBER	16704
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	DETAILED FUNCTIONAL		HR OPEI	7 1570
PARA OR STEP NO.	PROCEDURE STEP	1	RECORD DATUM/	,
	Verify on the CRT that digital			
	Word F bit 6 = 1			(~)
	bit 7 = 0.			(1)
2.4	Execute command:			
	MIDSCAN PULSE ENABLE A MIDSCAN PULSE ENABLE B	81		\$ \$\infty\$
	Verify on the CRT that digital			(,,
	Word F bit 6 = 1			(~)
	7 = 1.			()
1				
			,	
		<u> </u>	<u> </u>	
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	MODULE UNIT TEST A 113	NT NO NUMBER	16704	

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PARAGRAPH NO. 4.21

DETAILED FUNCTIONAL TESTS

		LOG A	HR OPE	۲ <i>၂5</i> 0۵
PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
4.21	SYSTEM CONFIGURATION FUNCTIONAL RECHECK			
1.	Confirm that test cables 40, 43, 44, 45, 46, and 28 are properly connected between the Electronics Module and the Function Test Panel.		~	(~)
2.	Connect test cable 20 and its breakout box to J20 on the Electronics Module.			(V)
3.	Connect test cables 2 and 3 and their breakout boxes to A5J2 and A5J3, the Electronics Module multiplexer video test access connectors.			(~)
4.	Initial Simulated Sensor Resistances			
	30KA resistor on Function Test Panel (FTP) across Blackbody Heater Input TP's (COLD).			(~)
	$18 \text{K}\Omega$ resistor on FTP across CFPA Heater control TP's (HOT).		<u> </u>	()
	$18 \mathrm{K}\Omega$ resistor on FTP across CFPA Monitor TP's (HOT).			(1)
	160Ω resistor on FTP across Cold Stage Heater Input TP's (<100°K).		<u> </u>	(1)
	$5K\Omega$ resistor on FTP across TP's 1 and 7 (Main Shutter Sensor-HOT).			(~)
	$30 \mathrm{K}\Omega$ resistor on FTP across TP's 2 and 8 (Backup Shutter Sensor-COLD).			(~)
	$8 ext{K} \Omega$ resistor on FTP across SMA + Z Heater Input TP's (HOT).			(~)
	8KO resistor on FTP across SMA - Z Heater Input TP's (HOT).			(N

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E. M.	MODULE	UNIT	TEST	· A	11323	MUMBER	6704	
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DETAILED FUNCTIONAL TESTS

-		LOG A	HR OPE	7 1500
PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(4.)	400Ω resistor on FTP across Intermediate Stage Heater Input TP's (COLD).			()
	$5 \mathrm{K}\Omega$ resistor on FTP across Blackbody (Frame) Sensor TP's 3 and 9 (HOT).			(~)
	$5 \mathrm{K}\Omega$ resistor on FTP across Blackbody Sensor TP's 5 and 11 (HOT).			(N)
	3KΩ resistor on FTP across Silicon FPA Sensor TP's b and 12 (HOT).		<u></u>	(~)
	$5 \mathrm{K}\Omega$ resistor on FTP across Baffle Heater Input TP's (HOT).			(V)
	5KΩ resistor on FTP across Baffle Temp Sensor TP's and 10 (COLD) .			(V)
5.	Execute the following commands to enable all concurrently functional circuitry:			
,	COOLER DOOR MOTOR OFF	53		(~)
	COOLER DOOR MOVE INHIBIT	88		(~)
	INCHWORM POWER OFF	50		(~)
	LVDT OFF	5£		(·)
	SMA + Z HEATER CONTROLLER ON	47.	<u> </u>	(~)
	SMA - Z HEATER CONTROLLER ON	43		(V)
	BLACKBODY HEATER CONTROL ON, T1 SELECT	2:10	~	(/)
	CFPA HEATER CONTROL ON/T1 SELECT/ CFPA TELEMETRY ON	1:9	<u></u>	(~)
	COLD STAGE OUTGAS HEATER ENABLE	5577	_ <u>k</u>	(~)
	MIDECAN PULSE A B DISABLED	92 S4		(1)

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DETAILED FUNCTIONAL TESTS

1		DETAILED FONCTIONAL	LOG AI	HR OPER	1500
S	ARA OR TEP NO:	PROCEDURE STEP		RECURD DATUM /	
([5.)	COLD STAGE HEATER CONTROLLER ON/TELEMETRY ON.	58		(r)
		DC RESTORE ON.	3E		(1)
		TELEMETRY SCALING ON.	7		(%)
		COOLER INTERMEDIATE STAGE HEATER CONTROLLER ON.	46		()
		COOLER INTERMEDIATE STAGE OUTGAS HEATER ENABLED.	45		(V)
		BAFFLE HEATER CONTROL ON.	54		(~)
		FUSIBLE LINK SWITCHES OPEN.	60		(V)
}		BLACKBODY BACKUP ON.	23		(1)
		COOLER DOOR ELECTROMAGNET OFF/ FRAME DC RESTORE SELECT.	1F		(/)
	,	MULTIPLEXER ON (POWER SUPPLY 1).	5		(V)
	•	CALIBRATION LAMP 1 ON.	10		(V)
		CALIBRATION LAMP 2 ON.	11		(r)
		CALIBRATION LAMP 3 ON.	12		(~)
		CALIBRATION LAMP SEQUENCE ON.	4 D		(~)
		CALIBRATION SHUTTER ON/BACKUP SHUTTER OFF/ DC RESTOKE NORMAL SELECT.	D		(V)
		SCAN LINE CORRECTOR 1 ON/ 2 OFF.	4A		(~)
		(POST AMPLIFIER POWER) BAND 1 ON.	2.5		(~)
		BAND 2 ON.	. 27	<u></u>	()

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E.M. MODULE UNIT TEST	SIZE A	11323	NUMBER	16704
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	DATA SHEET NO. 4 OF 56	PARAGRAPH	NO. <u>4 . 2</u>	<u>l</u>	
}	DETAILED FUNCTIONAL		HR OPE	R 1500	
. RA OR STEP NO.	PROCEDURE STEP		RECORD DATUM / VERIFY	UNITS	
(5.)	BAND 3 ON.	29		(>)	
	BAND 4 ON.	28	_ V	()	
	BAND 5 ON.	2 D		()	
	BAND 6 ON.	2 F	V	(~)	
	BAND 7 ON.	31		(V)	
6.	Calibration Lamp Driver/Sequence Check		/		
6.1	Verify via the CRT that digital	!			
	Word D bit 0 = 1		<u>v</u>	(1)	
	bit 1 = 1			(V)	
	bit 2 = 1			(v)	
	Word F bit 6 - 1			(~)	
	bit 7 = 0.		<u></u>	(~)	
6.2	Execute command:				
	CALIBRATION LAMP 1 OFF/OVERRIDE OFF.	16		(Z)	
6.2.1	Verify via the CRT that digital				
	Word D bit 0 = 0.		V	(~)	
6.3	Connect the Cal Lamp Housing containing the lamp and photodiode assembly to the Cal Lamp #1 (sensor) anode and cathode, and (lamp) "+" and "-" points on the Function Test Panel (FTP). Note: If Cul Lamp Housing containing three 'amps			(7	
	s used all connections can be made initially and Para + 21 6 4 and 4.21 6 5 reconnections can be enorge	•			
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E. M.	MODULE	UNIT	TEST	A		16704
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PARAGRAPH NO. 4.21

DETAILED FUNCTIONAL TESTS

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PARA OR STEP NO.	PROCEDURE STEP		RECORD DATUM:/	
6.3.1	Execute command:	l		
	CALIBRATION LAMP 1 ON.	10		()
			<u></u>	(V)
6.3.2	Verify that analog telemetry			
	Channel 50 "Calibration Lamp 1 Current" = 3.1(±0.6)V.	3.1(±0.6)	3.16	volts
6.3.3	Using a DVM, verify that J20-7 "Lamp #1 Radiance Error" with respect to J20-51 = 7.0(±1.5)V.	7.0(±1.5)	6.28	volts
	Execute Command: CALIBRATION LAMP 1 OVERRIDE ON	13		()
	Verify via the CRT that digital Word D bit 3=1.		V	()
6.3.4	Execute command:			
	CALIBRATION LAMP 1 OFF/OVERRIDE OFF.	16		(')
-	CALIBRATION LAMP 2 OFF/OVERRIDE OFF.	17		(~)
6.3.6	Verify via the CRT that digital		;	
	Word D bit 1 = 0.			(~)
6.4	Disconnect the Cal Lamp Housing from FTP; connect Cal Lamp Housing to Cal Lamp #2 (sensor) anode and cathode and (lamp) "+" and "-" points to FTP.		<u></u>	(~)
6.4.1	Execute:			
	CALIBRATION LAMP 1 ON.	10		(V)
	CALIBRATION LAMP 2 ON	. 11	<u>~</u>	(~)

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E.M. MODULE UNIT TEST	A	11323	16704
	SCALE	REV	SHEET 5

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DATA SHEET NO. 6 OF 50

PARAGRAPH NO. 4.21

DETAILED FUNCTIONAL TESTS

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PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
6.4.2	Verify that analog telemetry			
	Channel 51 "Calibration Lamp 2 Current" = 3.1(±0.6)V.	3.1(±0.4)	3.24	volts
6.4.3	Using a DVM, verify that $J20-8$ "Lamp 2 Radiance Error" = 7.0(± 1.5)V.	7.0(±1.5)	6.48	volts
	Execute Command: CALIBRATION LAMP 2 OVERRIDE ON	14		()
6.4.4	Verify via the CRT that digital Word D bit 4 = 1.			()
6.4.5	Execute command:			
	CALIBRATION LAMP 2 OFF/OVERRIDE OFF.	17		(V)
`	CALIBRATION LAMP 3 OFF/OVERRIDE OFF.	1.8		(~)
6.4.6	Verify via the CRT that digital			
	Word D bit 2 = 0.		<u> </u>	(V)
6.5	Disconnect the Cal Lamp Housing from FTP; connect Cal Lamp Housing to Cal Lamp #3			
	(sensor) anode and cathode and (lamp) "+" and "-" points to FTP.			(1)
6.5.1	Execute:			
	CALIBRATION LAMP 2 ON.	11		(1)
	CALIBRATION LAMP 3 ON.	12	<u> </u>	(~)
5.5.2	Verify that analog telemetry			
	Channel 52 "Calibration Lamp 3 Current" = 3.1(±0.6)V.	3.1(±0.6)	3.32	volts

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	SCALE REV	SHEET 5

DATA SHEET NO. _____ OF ____ PARAGRAPH NO. 4.21_ DETAILED FUNCTIONAL TESTS

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PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
6.5.3 6.5.3.1 6.5.4 6.5.5	Using a DVM, verify that J20-9 "Lamp 3 Radiance Error" = 7.0(±1.5)V. Execute Command: CALIBRATION LAMP 3 OVERRIDE ON Verify via the CRT that digital Word D bit 5 = 1. Execute commands:	7.0(±1.5) 15	6.59	volts () (~)
	CALIBRATION LAMP 3 OFF/OVERRIDE OFF. CALIBRATION LAMP 3 ON.	18 12	<u> </u>	(V)
6.6	Confirm that the three Cal Lamp LED indicators (1,2,3) on the FTP sequence through the following steps:	FTP Indicators Lit		
7	1	None	<u></u>	(1)
	2	1		(V)
	3	1,2		(/)
	4	2		(1)
	5	2.3	_1	(1)
	6	1,2,3		(~)
	7	1,3		(1)
	8	3		(1)
7.	Blackbody Control Check			
	Verify via the CRT that digital			
	Word E bit 2 = 1			(V)

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E. M.	MODULE	UNIT	TEST	SIZE	11323	NUMBER	16704
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DETAILED FUNCTIONAL TESTS

		LOG A	HR OPE	7 1500
PARA OR STEP NO.	PROCEDURE STEP		RECORD DATUM/	
(7.)	bit 5 = 1.			(V)
}	Verify via the CRT that analog telemetry			
	Channel 53 "Blackbody Current" ≥2.5V.	22.5	3.72	volts
7.1	Normal T1 On.			
	Execute commands:		!	
	BLACKBODY HEATER CONTROL OFF/BACKUP OFF.	24		()
	BLACKBODY HEATER CONTROL ON/T1 SELECT.	20		. (~)
	Verify via the CRT that digital	ļ	:	
	Word E bit 2 = 1			(1)
	bit 3 = 0			(4)
	bit 4 = 0			(/)
	bit 5 = 0.			(4)
7.2	Normal T2 On.			
	Execute commands:			
	BLACKBODY HEATER CONTROL OFF/BACKUP OFF.	24		(~)
	BLACKBODY HEATER CONTROL ON/T1 SELECT.	20	V	(~)
	BLACKBODY T2 SELECT.	21		(4)
	Verify via the CRT that digital			
	Word E bit 2 = 1			(<)
	bit 3 = 1	•		(~)

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E. M.	MODULE	UNIT	TEST	SIZE A	11323	NUMBER	16704
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DETAILED FUNCTIONAL TESTS

		LOG A	HR OPER	7 1500
PARA OR STEP NO.	PROCEDURE STEP		RECORD DATUM /	
(7.2)	· bit 4 = 0			(V)
	bit 5 = 0.			()
7.3	Normal T3 On.		<u> </u>	
	Execute commands:			
	BLACKBODY HEATER CONTROL OFF/BACKUP OFF.	24		(~)
	BLACKBODY HEATER CONTROL ON/T1 SELECT.	20		(~)
	BLACKBODY T3 SELECT.	22		(V)
	Verify via the CRT that digital		_	
	Word E bit 2 = 1			(V)
የ	bit 3 = 0			(レ)
	bit 4 = 1			(~)
	bit 5 = 0.			(v)
7.4	Thermistor Test.			
	Replace Blackbody Heater Input Resistor at FTP with 5000 ohms.			(/)
	Verify via the CRT that analog telemetry			
	Channel 53 is ≤1.0v.	≤1.0	0.000	volts
	Replace Blackbody Heater Input Resistor at FTP with 30000 ohms.			(~)
	Verify via the CRT that analog telemetry			
	Channel 53 is ≥2.5 volts.	22.5	3.72	volts
			<u> </u>	

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DETAILED FUNCTIONAL TESTS

		LOG A	HR OPE	7500
PARA OR STEP NO.	PROCEDURE STEP		RECORD DATUM/	
7.5	Reset Relavs.			
	Execute command:		,	
	BLACKBODY HEATER CONTROL OFF/BACKUP OFF.	24		(1)
	Verify via the CRT that digital			
	Word E bit 2 = 0			(V)
	bit 5 = 0.			(4)
7.6	Set Blackbody Heater Relay.			
	Execute command:			
	BLACKBODY HEATER ON, T1 ON.	20		(V)
3.	CFPA Heater Control Check.			
8.1	CFPA Heater Monitor and Controller Off.			
8.1.1	Execute commands:			
	CFPA TELEMETRY OFF.	1 C		(V)
	CFPA HEATER CONTROL OFF.	1 D		(/)
8.1.2	Verify via the CRT that digital			
	Word H bit 4 = 0		<u> </u>	(V)
	bit 5 = 0			(/)
	bit 6 = 0	,		(~)
	bit 7 = 0.			(V)
		•		

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DETAILED FUNCTIONAL TESTS

		LOG A	HR OPEF	1500
PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
8.1.3	Verify via the CRT that analog telemetry			
	Channel 68 "CFPA Reater Current" is \$1.07.	≤1.0	0.00	volts
	Channel 70 "CFPA Aonitor Temperature" is ≤1.0V.	≤1.0	0.07	volts
	Channel 67 CFPA Control Temperature" is ≤1.0V	≤1.0	0.00	volts
8.2	CFPA Heater Controller Off.			
8.2.1	Execute commands:			
	CFPA HEATER CONTROL ON/T1 SELECT/ CFPA TELEMETRY ON.	19		(v)
· •	CFPA HEATER CONIROL OFF.	10		(1)
8.2.2	Verify via the CRT that digital			
	Word H bit 4 = 0			(V)
	b1t 5 = 0			(~)
	bit 6 = 0			(1)
	bit 7 = 1.			(~)
8.2.3	Verify via the CRT that analog telemetry			
	Channel 68 is ≤1.0V.	≤1.0	0.00	volts
8.3	Heater Controller Off/T2 On.			
8.3.1	Execute commands:			
	CFPA HEATER CONTROL ON/T1 SELECT/ CFPA TELEMETRY ON.	. 19		(~)

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E.M. MODULE UNIT TEST	Size A	11323	NUMBER	16704
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DETAILED FUNCTIONAL TESTS

	DETAILED FUNCTIONAL		HR OPEF	1500
PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(8.3.1)	CFPA HEATER CONTROL OFF.	10	_/_	(~)
	CFPA T2 SELECT.	1A		(V)
8.3.2	Verify via the CRT that digital			
	Word H bit 4 = 0			(~)
	bit 5 = 1			(/)
	5it 6 • 0		<u>/</u>	(/)
	bit 7 = 1.			(/)
8.3.3	Verify via the CRT that analog telemetry	į		
	Channel 68 is \$1.0V.	≤1.0	0.00	volts
1.4	Heater Controller Off/T3 On.			
8.4.1	Execute commands:			
	CFPA HEATER CONTROL ON/T1 SELECT/ CFPA TELEMETRY ON.	19		(~)
	CFPA HEATER CONTROL OFF.	15		(~)
į	CFPA T3 SELECT.	13		(~)
3.4.2	Verify via the CRT that digital			
	Word H Bit 4 = 0			(4)
<u> </u>	bit 5 = 0			(~)
1	bit 6 = 1			(~)
	bit 7 = 1.			(~)
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DETAILED FUNCTIONAL TESTS

	DETAILED TONCTIONAL		HR OPER	1500
PARA POR P STEP STEP	PROCEDURE STEP		RECORD DATUM / VERIFY	
8.4.3	Verify via the CRT that analog telemetry Channel 68 is ≤1.0V.	≤1.0	0.00	volts
8.5	Heater Controller On/Tl On			
8.5.1	Execute Command:			
	CFPA HEATER CONTROL ON/T1 SELECT/ CFPA TELEMETRY ON.	19	<u>/</u>	(_V)
8.5.2	Verify via the CRT that digital		,	
	Word H bit 4 = 1			(Y)
	bit 5 = 0			· (V)
	bit 6 = 0 '			(Y)
	bit 7 = 1.			(Y)
8.6	Test Control Diode			
8.6.1	Verify via the CRT that analog telemetry			
	Channel 67 is ≤1.0V.	≤1.0	0.00	volts
	Channel 68 is ≤1.0v.	≤1.0	0.00	volts
8.6.2	Replace CFPA Heater Control resistor at FTP with 19000 ohms. Record the level of analog telemetry			
	Channel 67,		140	volts
	Channel 68.		0.00	volts
8.6.3	Replace CFPA Heater Control resistor at FTP with 20000 ohms ("cold")	,		

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			LOG A	HR OPER	7 1500
	PARA STEP STEP	PROCEDURE STEP		RECORD DATUM / VERIFY	UNITS
	(8.6.3)	Verify that analog telemetry			
		Channel 67 is 22.5 volts,	≥2.5	5.0	volts
		Channel 68 is 22.5 volts.	≥2.5	4.9	volts
	8.7	Test Monitor Diode.			
	8.7.1	Verify that analog telemetry			
		Channel 70 is ≤1.0 volts.	≤1.0	.94	volts
	8.7.2	Replace resistor across the CPPA Monitor TP's at FTP with 19000 ohms and observe the level of analog telemetry channel 70.		1.440	volts
A		Replace resistor across the CFPA Monitor TP's at FTP with 20000 ohms ("cold"), and verify that analog telemetry			
		Channel 70 is ≥2.5V.	≥2.5	4.96	volts
	9.	Cold Stage Outgas Heater Control			
	9.1	Heater Disabled/Controller Off/ Temp Monitor On.			
	9.1.1	Execute commands:		_	
		COLD STAGE HEATER CONTROLLER ON/ TELEMETRY ON.	58		(1
		COLD STAGE HEATER CONTROLLER OFF/ COLD STAGE OUTGAS HEATER DISABLED.	59		(v)
1	9.1.2	Verify via the CRT that digital		/	
ļ		Word B bit 7 = 1		<u> </u>	(V)
			•		

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E.M. MODULE UNIT TEST	A Size	11323	NUMBER	16704
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DETAILED FUNCTIONAL TESTS LOG AHR OPER									
	PARA OR STEP NO.	PROCEDURE STEP		SPE OR COMM		RECORD DATUM / VERIFY	UNITS		
	(9.1.2)	Word H bit 0 = 0					(5)		
		bit 1 = 0.				~	(~)		
	9.1.3	Verify via the CRT that analog teleme	try						
		Channel 55 is ≤1.0V.		≤1.	0	0.00	volts		
		•							
	9.2	Heater Disabled/Controller and Temp Monitor On.							
	9.2.1	Execute command:	Ì			_			
		COLD STAGE HEATER CONTROLLER ON/ . TELEMETRY ON.		58		<u> </u>	(1)		
	9.2.2	Verify via the CRT that digital	į.						
		Word B bit 7 = 1				<u> </u>	(~)		
		Word H bit 0 = 1					(~)		
		bit $l = 0$.					(~)		
	9.2.3	Using a DVM, verify that test point				.1 H	-		
	!	J20-17 is in the range $.1 < V < .5V$	j	.1 < V <	. 5		volts		
	9.2.4	Display and note the values of analog telemetry				.54			
		Channel 55	1			0.00 A	volts		
		Channel 63				0.00 A	volts		
		Channel 64.		•		1.70 to	& volts		
		,	-						
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PARAGRAPH NO. 4.21

DETAILED FUNCTIONAL TESTS

	· · · · · · · · · · · · · · · · · · ·	LOG A	HR OPE	7 1500
PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
9.2.5	Replace resistor on FTP across Cold Stage Heater Input TP's from its minimum value of 00160 ohms to 00400 ohms ("1250K").			('
	Verify that analog telemetry Channel 55 approaches zero volts. Channel 63 changes to ≤1.0∨.		<u>0.0</u>	(\(\sigma \)
	Channel 64 decreases from its initial value by 1.0 ± 0.5V.		3.6	(V)
9.3	Heater Enabled/Controller and Temp Monitor On			
9.3.1	Execute commands:		-	
	COLD STAGE HEATER CONTROLLER ON/ TELEMETRY ON.	58		([/])
	COLD STAGE OUTGAS HEATER ENABLE.	57		(~)
9.3.2	Verify via the CRT that digital		r	
	Word B bit 7 = 1			(r)
	Word H bit 0 - 1			(~)
	bit 1 = 1.			(~)
9.3.3	Display and note the values of analog telemetry			
	Coannel 55		3.7	volts
	Channel 64.		3.6	volts
L		<u> </u>	<u> </u>	<u> </u>

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DETAILED FUNCTIONAL TESTS

		LOG A	HR OPER	7 1500
PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
9.3.4	Replace resistor on FTP across Cold Stage Heater Input TP's with 01200 ohms ("hot").	-		(V)
	Verify that analog telemetry			
1	Channel 55 approaches zero volts.	<u>.</u>		(V)
	Channel 64 approaches zero volts.			(7)
10.	DC RESTORE/CAL SHUTTER SENSORS/CAL SHUTTER CONTROL CHECK			
<u> </u>	Connect a DVM set on its 20V scale between the DC Restore TP and signal ground at FTP.			(~)
10.1	DC Restore OFF.			
10.1.1	Execute command:			
	DC RESTORE OFF/TELEMETRY SCALING OFF.	6		(V)
10.1.2	Verify via the CRT that digital			
	Word L bit 0 = 0.		<u></u>	(V)
10.1.3	Verify via the CRT that analog telemetry			
	Channel 61 "Calibration Shutter Temperature" is zero.	≤0.@1	<u>v 0.00</u>	volts
	Channel 62 "Backup Shutter Temperature" is zero.	≤0.@1	<u>~ 0.00</u>	volts
	Verify that the DVM is measuring zero voltage.	· ≤0.⊕1	<u>vo.00</u>	volts

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E. M.	MODULE	UNIT	TEST	A		NUMBER 16704	1
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DETAILED FUNCTIONAL TESTS

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PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
10.2	DC Restore On/Normal Mode Select	_		
10.2.1	Execute commands: DC RESTORE	3E		(V)
	SHUTTERS OFF.	F		(✓)
	CAL SHUTTER ON/BACKUP SHUTTER OFF/DC RESTORE NORMAL SELECT.	3		(√)
10.2.2	Verify via the CRT that digital		-	
	Word G bit 2 = 1			(V)
	bit 5 = 0.			(V)
	Wait one minute,			
7	then verify that digital			
	Word G bit 3 = 1			(~)
	bit 4 = 1.			(V)
10.2.3	Verify via the CRT that digital			
	Word L bit 0 = 1.			(~)
10.2.4	Verify via the CRT that analog telemetry			
	Channe⊥ 61 is ≤1.0V.	≤1.0	0.0	volts
	Channel 62 is ≥2.5V.	≥2.5	4.6	volts
	Verify that the DVM is measuring \$1.0V.	≤1.0		volts
10.2.5	Remove resistor across TP's 1 to 7 on FTP and replace with 30000 ohms ("cold").			(-/)

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DETAILED FUNCTIONAL TESTS

		LOG A	HR OPER	7 1500
PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(10.2.5)	Remove resistor across TP's 2 to 8 on FTP and replace with 05000 ohms ("hot").		V	(~)
	Verify via the CRT that analog telemetry		4 5)	
	Channel 61 is ≥2.5V	≥2.5	4.8	volts
	Channel 62 is ≤1.0V	≤1.0	0.0	volts
	Verify that the DVM is measuring ≥1.8 volts.	1.45 ≥ 1.8	1.6	volts
10.3	DC Restore On/Backup mode Select	15€2 €0.4089		
10.3.1	Remove resistor across TP's 1 to 7 on FTP and replace with 5000 ohms	·		(V)
! }	Remove resistor across P's 2 to 8 on FTP and replace with 30000 ohms			(V)
10.3.2	Execute commands:		l	
	DC RESTORE OFF/TELEMETRY SCALING OFF.	6		(V)
	DC RESTORE ON.	3E		(V)
	BACKUP SHUTTER ON/CALIBRATION SHUTTER OFF/DC RESTORE BACKUP SELECT.	E		(V)
10.3.3	Verify via the CRT that digital			
	Word G bit 2 = 0			(1)
	bit 5 = 1.			(/)
	Wait one minute,		}	
	then verify that digital	,		
	Word G bit 6 = 1		V	()

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PARA OR SPEC FOR STEP OR COMMAND	RECORD DATUM/ VERIFY	
	<u> </u>	(1)
(10.3.3) bit 7 = 1.	•) !
10.3.4 Verify via the CRT that digital		
Word L 51t 0 = 0.		(V)
10.3.5 Verify via the CRT that analog telemetry		
Channel 61 is \$1.0V. \$1.0	6.0	volts
Channel 62 is ≥2.5V. ≥2.5	1.6	volts
Verify that the DVM is measuring $\geq 1.8 \text{V}$.	1.6	volts
Remove resistor across TP's 1 to 7 on FTP and replace with 30000 ohms.	<u></u>	(")
Remove resistor across TP's 2 to 8 on FTP and replace with 5000 ohms.	<u></u>	(V)
Verify via the CRT that analog telemetry		
Channel 61 is 22.5V. 22.5	4.7	volts
Channel 62 is ≤1.0V. ≤1.0	0.0	volts
Verify that the DVM is measuring ≤1.0 volts. ≤1.0	5	volts
11. Scan Mirror Assembly + Z Recheck		
Connect a DVM across the SMA - 2 Heater Output TP's at FTP.		(~)
11.1 ± 2 Heaters Off.		
11.1.1 Execute command:		
SMA + Z Heater Controller Off. 42		(r)

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		LOG A	HR OPE	7 <u>500</u>
PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(11.1.1)	SMA - Z Heater Controller Off.	44	_v	(V)
11.1.2	Verify via the CRT that digital			
	Word A bit 2 = 0			(~)
	bit 3 = 0.			(~)
``	Verify that the DVM is measuring ≤10mV.	≤10	<u> </u>	mvolts
11.1.3	Reconnect a DVM across the SMA + Z Heater Output TP's at FTP.		<u></u>	(<i>V</i>)
Ì	Verify that the DVM is measuring ≤10mV.	≤10	_0	mvolts
11.2	SMA + Z Heater On/- Z Heater Off.			
.2.1	Execute Command:			
Ì	SMA + 2 Heater Controller On	41		(V)
11.2.2	Verify via the CRT that digital			
ļ	Word A bit 2 = 1			(V)
	3 = 0.		V	(V)
11.2.3	Verify that DVM is measuring ≤10mV	≤10		mvolts
11.2.4	Remove resistor on FTP across SMA + Z Heater Input TP's and replace with 12000 ohms (cold).		V	(<i>Y</i>)
	Verify that DVM is measuring ≥500mV.	≥500	886	mvolts
11.3	SMA + Z Heater OFF/- Z Heater ON			
		•		

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11	.3.1	Execute Command:			
		SMA + I Heater Controller OFF.	42		(~)
		SMA - 2 Heater Controller ON.	43		(~)
11	.3.2	Verify via the CRT that digital			
		Word A bit 2 = 0			(~).
		bit 3 = 1.			(m)
11	.3.4	Reconnect a DVM across the SMA $-$ Z Heater Output TP's at FTP.		~	(V)
		Verify that DVM is measuring ≤10mV.	≤10	_0_	mvolts
 	.3.5	Remove resistor on FTP across SMA - Z Heater Input TP's and replace with 12000 ohms ("cold").		<u></u>	(1)
1		Verify that DVM is measuring ≥500mV.	≥500	_887_	mvolts
11	.3.6	Execute Command:			
		SMA - Z Hearer Controller Off	44		(~)
12		Intermediate Stage Outgas Heater Control			
		Connect a DVM across the Intermediate Stage Heater TP's at FTP.		<u></u>	('
12	.1	Intermediate Stage Heater Controller Off/ Heater Disabled.			
12.	.1.1	Execute command:			
		COOLER INTERMEDIATE STAGE HEATER CONTROLLER OFF/HEATER DISABLED.	. 47		(~)

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DETAILED FUNCTIONAL TESTS

L		LOG A	HR OPER	<u>1500</u>
PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	
12.1.2	Verify via the CRT that digital			
	Word H bit 2 = 0			()
	bit 3 ∞ 0.			()
12.1.3	Verify via the CRT that analog telemetry			
	Channel 65 "Intermediate Stage Temperature A (cold)" is ≤1.0V.	≦1.0	0.0	volts
	Channel 66 "Intermediate Stage Temperature B (hot)" is ≤1.0V.	≤1.0	0.0	volts
	Verify that the current monitoring DVM is measuring ≤ 10 mV.	≤10		mvolts
.' 2.2]	Intermediate Stage Heater Controller On/ Heater Disabled.			
12.2.1	Execute command:			
	COOLER INTERMEDIATE STAGE HEATER CONTROLLER ON.	46		(V)
12.2.2	Verify via the CRT that digital			
	Word H bit 2 = 1			(/)
	bit 3 = 0.			(4)
	Verify that the DVM is measuring ≤10mV.	≤10		mvolts
12.2.3	Display analog telemetry channels 65 and 66 on the CRT.			
	Record the values of			
	Channel 65,	. (>2.5)	3.82	volts
	Channel 66.	(52.5)	2.96 4.	volts

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PARAGRAPH NO. -4-21

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DETAILED FUNCTIONAL TESTS

LOG AHR OPER 500 PARA RECORD SPEC OR DATUM / UNITS PROCEDURE STEP OR STEP COMMAND VERIFY NO 12.2.4 Remove resistor on FTP across Intermediate Stage Heater Input TP's and replace with V . (1) 600 ohms. 0.0 Verify that Channel 65 goes to ≤1.0%. ≤1.0 volts 3.12 volts Record the value of Channel 66. Remove resistor on FTP across Intermediate 12.2.5 Stage Heater Input TP's and replace with (V) 1200 ohms. .1 Verify that Channel 66 goes to ≤1.0V. ≤1.0 volts 0.5 ≤1.0 volts Verify that Channel 65 remains ≤1.0V. 12.2.6 Remove resistor on FTP across Intermediate Stage Heater Input T2's and replace with / **(/**) 400 ohms. Intermediate Stage Heater Controller On/ 12.3 Heater Enabled. 12.3.1 Execute Commands: COOLER INTERMEDIATE STAGE HEATER **(** \(\) CONTROLLER ON. 46 COOLER INTERMEDIATE STAGE OUTGAS (1 45 HEATER ENABLED. 12.3.2 Verify via the CRT that digital (1) Word H bit 2 = 1 1 bit 3 = 1. (1) 12.3.3 Verify that the current monitoring DVM 439 ≥300 is measuring ≥300 mV. mvolts

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E.M. MODULE UNIT TEST	SIZE A	11323	16704
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	DATA SHEET NO. 25 OF 56	PARAGRAPH	NO. <u>4.21</u>	_
	DETAILED FUNCTIONAL		HR OPE	7 1500_
PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(12.3.3)	Using a DVM verify that test point J20-22 "Intermediate Outgas On/Off Test" is in the range .1 < V < 1.0 volts.	.1 < V < 1.0	21	volts
]	Using a DVM verify that J20 .60 "Outgas Control Test" is ≥3.0 volts.	≥3.0	4.4	volts
12.3.4	Remove resistor on FTP across Intermediate Stage Heater Input TP's and replace with 1200 ohms.			volts
	Verify that the current monitoring DVM is measuring $\leq 10 \text{mV}$.	≤10	0	mvolts
	Verify that J20-22 is in the range $1 < V < y \le V$.	1 < V < 95	90	volts
1	Verify that J20-60 is \$1.0 volts.	≤1.0	0.50	volts
13.	Scan Line Corrector Test			
13.1	SLC #1 On/SLC #2 Off.			
13.1.1	Execute commands:			
	SCAN LINE CORRECTORS OFF	4C		(V)
	SCAN LINE CORRECTOR 1 ON/2 OFF	4 A		(/)
13.1.2	Verify via the CRT that digital	•		
	Word G bit 0 = 1			(~)
	bit 1 = 0.			(~)
13.1.3	Verify via the CRT that analog telemetry			
	Channel 44 "SLC 1 Drive Current" is 2.5 ± 2.5V, *	2.5 ± 2.5 *	2.2 - 2.8	volts
	* Waveform is a sawtooth			
		`		
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E.M. MODULE UNIT TEST

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PARAGRAPH NO. 4.21

DETAILED FUNCTIONAL TESTS

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PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
13.1.3)	Channel 46 "SLC 1 ± 15V" is 2.5 ± 0.3V.	2.5 ± 0.3	2.52	volts
	Shannel 47 "SLC 1 + 5V" is 2.5 \pm 0.1V.	2.5 ± 0.1	2.52	volts
13 1.4	Using an oscilloscope confirm that the output of test point J20-1 "SLC 1 Integrator" corresponds to Figure 4.11A	Fig. 4.11A		(V)
13.1.5	Using an oscilloscope confirm that the output of J20-2 "SLC 1 Torquer Current" corresponds to Figure 4.11B.	Fig. 4.11B		(~)
13.1.6	Using an oscilloscope confirm that the output of J20-3 "SLC 1 Switch Tach" corresponds to Figure 4.11C.	Fig. 4.11C		(~)
13.2	SLC #1 Off/SLC #2 On.			
.2.1	Execute command:			
	SCAN LINE CORRECTOR 2 ON/1 OFF.	48		(~)
13.2.2	Verify via the CRT that digital		,	
	Word G bit 0 = 0			(~)
	bit 1 = 1.			(~)
13.2.3	Varify via the CRT that analog telemetry			
	Channel 45 "SLC 2 Drive Current" is 2.5 ± 2.5V. *	2.5 ± 2.5 *	25-33	volts
	Channel 48 "SLC 2 ± 15V" is 2.5 ± 0.3V.	2.5 ± 0.3	2.44	volts
	Chant.el 49 "SLC 2 + 5V" is 2.5 ± 0.1V.	2.5 ± 0.1	2.46	volts
13.2.4	Using an oscilloscope confirm that the output of J20-4 "SLC 2 Integrator" corresponds to Figure 4.11A. * Waynform is a sawtooth	Fig. 4.11A		(~)

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PARAGRAPH NO. 4.21

DETAILED FUNCTIONAL TESTS

	DETAILED TONCTIONAL		HR OPE	7500	
PARA OR STEP NO.	PROCEDURE STEP		RECORD DATUM /	-	
12.2.5	Using an oscilloscope confirm that the output of J20-5 "SLC 2 Torquer Current" corresponds to Figure 4.11B.	Fig. 4.11B		(v)	
13.2.6	Using an oscilloscope confirm that the output of J20-6 "SLC 2 Switch Tach" corresponds to Figure 4.11C.	Fig 4.11C	<u></u>	(1)	
14.	Telemetry Scaling.				
	To measure the DC Restore Signal to the MUX connect a DVM set on its 20V scale across the DC Restore TP and signal ground on the FTP.		<u> </u>	(v)	
14.1	DC Restore - Telemetry Scaling Off				
4.1.1	Execute commands:				
	COOLER DOOR ELECTROMAGNET OFF/FRAME DC RESTORE SELECT.	1F		()	
	Verify via CRT that digital Word L bit 1=1			(~)	
14.1.2	Execute Command:				
	DC RESTORE OFF/ TELEMETRY SCALING OFF	· 6	<u>v</u>	(')	
	Verify via CRT that digital Word L.bit 2=0			(~)	
14.1.3	Verify via the CRT that analog telemetry				
	Channel 59 "Blackbody Temperature" is is ≤1.0V.	≤1.0	0.0	volts	
	Channel 60 "SiFPA Temperature is ≤1.0V.	≤1.0	0.0	volts	
14.2	Telemetry Scaling On/Backup DC Restore Selected.				
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PARAGRAPH NO. 4.21

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 500 PARA RECORD SPEC OR. UNITS DATUM / PROCEDURE STEP OR STEP VERIFY COMMAND NO 14.2.1 Execute commands: (1) 7 TELEMETRY SCALING ON. COOLER DOOR ELECTROMAGNET OFF/ FRAME DC RESTORE SELECT. (V) 1F BACKUP SHUTTER ON/CALIBRATION SHUTTER OFF/DC RESTORE BACKUP SELECT. Ε (V) 14.2.2 | Verify via the CRT that digital (m) Word L bit 1 = 0 (W) bit 2 = 1. 14.2.3 Verify via the CRT that analog telemetry 3.6 ≥2.5 volts Channel 59 is ≥2.5V Channel 60 is ≥ 2.5 V. ≥2.5 volts 14.3 Telemetry Scaling On/Normal DC Restore Selected 14.3.1 | Execute commands: (1) 7 TELEMETRY SCALING ON. COOLER DOOR ELECTROMAGNET OFF/ 1F (1) FRAME DC RESTORE SELECT. CALIBRATION SHUTTER ON/BACKUP SHUTTER OFF/DC RESTORE NORMAL (~) SELECT. D 14.3.2 Verify via the CRT that digital ()Word L bit 1 = 3 (L)

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E.M. MODULE UNIT TEST	SIZE	11323	
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bit 2 = 1.

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	DETAILED FUNCTIONAL		HR OPER	2 1500
PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
14.3.3	Verify via the CRT that analog telemetry			
	Channel 59 is ≥2.5V	≥2.5	3.6	volts
	Channel 60 is ≥2.5V.	≥2.5	4.7	volts
14.3.4	Verify that the DVM is measuring zero volts.	<10	0.0	nvolts
14.4.1	Telemetry Scaling on/Frame DC Restore Selected Execute commands:			
14.4.1	TELEMETRY SCALING ON.	7	v	(_V)
	COOLER DOOR ELECTROMAGNET OFF/ FRAME DC RESTORE SELECT.	1F	V	(V)
4.2	Verify via the CRT that digital		·	į
	Word L bit l = 1			(V)
	bit 2 = 1.		<u></u>	(V)
14.4.3	Verify that the DVM is measuring ≤1.0 volts.	≤1.0	0.54	volts
14.4.4	Remove resistor on FTP across TP's 3 to 9 and replace with 30000 ohms.			(レ)
	Remove resistor on FTP across TP's 5 to 11 and replace with 30000 ohms.			(~)
	Remove resistor on FTP across TP's 6 to 12 and replace with 20000 ohms.		<u></u>	()
14.4.5	Verify via the CRT that analog telemetry		0.0	
	Channel 59 is ≤1.0 volts	. ≤1.0	-K	volts
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DETAILED FUNCTIONAL TESTS

		LOG A	HR OPE	7 1500
PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(14.4.5)	Channel 60 is ≤1.0 volts.	≤1.0	0.0	volts
14.4.6	Verify that the DVM is now measuring 21.8 volts.	1. 90 2 1.8 see 80	1.62	volts
15.	Fusible Link Check	1089A		
	Connect a DVM across the Cooler Door Fusible Link test points at the FTP	10%	•	
15.1	All Fusible Link Switches Open			
15.1.1	Execute command:			
	FUSIBLE LINK SWITCHES OPEN.	60	<u></u>	(1)
15.1.2	Verify via the CRT that digital			
'. *1	Word A bit 5 = 0			(⁽)
	bit 6 = 0			(')
	bit 7 = 0			(V)
	Word C bit 5 = 0			(~)
	bit 6 = 0			()
	bit 7 = 0.			(V)
15.1.3	Verify that the voltage across the Cooler Door Fusible Link TP's is ≤10 mV.	≤10	0.0	mvolts
15.2	All Cooler Door Switches Closed/Cooler Door Fusible Link Activated.			
15.2.1	Execute Commands:			
	COOLER DOOR FUSIBLE LINK SWITCH A CLOSE.	· 5A		· (レ)

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PARAGRAPH NO. 4.21

		DETAILED TONGTIONAL		HR OPE	<u> 1500</u>	
	PARA OR STEP NO.	PROCEDURE STEP		RECORD DATUM/		
	(15.2.1)	COOLER DOOR FUSIBLE LINK SWITCH B CLOSE.	48		()	ļ
		COOLER DOOR FUSIBLE LINK SWITCH C CLOSE.	5C		(1)	
	15.2.2	Verify via the CRT that digital				l
		Word C bit 5 = 1			(V)	
		bir 6 = 1			(1)	١
		. bit 7 = 1		<u> </u>	(V)	
		Word A bit 5 = 0	· :		(V)	l
		51 t 6 = 0		<u></u>	(V)	
		bit 7 = 0.			(V)	
· :	2.3	Verify that the Cooler Door Fusible Link Sonalert is switched to the Alarm position and is sounding (it may be turned off after verification). Verify that the indicator LED is lit.			(V)	V
	15.2.4	Verify that there is ≥ 1.0 V across the Cooler Door Pusible Link TP's with DVM.	≥1.0	<u> 1,5</u>	volts	
	15.2.5	Verify that there is ≤10 mV across the Main Shutter Fusible Link TP's with DVM.	≤10	0.0	mvolts	
	15.2.6	Execute command				
		FUSIBLE LINK SWITCHES OPEN	60	· ~	(r)	
	15.3	All Shutter Switches Closed/Shutter Fusible Link Activated.				

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DETAILED FUNCTIONAL TESTS

	DETAILED TONGTIONAL	LOG A	HR OPER	7500
PARA OR STEP NO.	PROCEDURE STEP		RECORD DATUM /	
15.3.1	Execute Commands:			
	SHUTTER FUSIBLE LINK SWITCH A CLOSE.	50		(V)
	SHUTTER FUSIBLE LINK SWITCH B CLOSE.	49	<u></u>	(~)
,	SHUTTER FUSIBLE LINK SWITCH C CLOSE.	5 F		(1)
15.3.2	Verify via the CRT that digital			
	Word A bit 5 = 1			(レ)
	bit 6 = 1			(1)
	500 bit 7 = 1			
	Word C bit 5 = 0			()
7	bit 6 = 0			(1-)
	5it 7 = 0.			(1)
15.3.3	Verify that the Shutter Fusible Link Sonalert is switched to the Alarm position and is sounding. Verify that the indicator LED is lit.			(L)
15.3.4	Using a DVM, verify that there is 2'.0V across the Shutter Fusible Link IP's on FTP.	≥1.0	1.51	volts
	Verify that there is ≤10mV across the Cooler Door Fusible Link TP's on FTP.	≤10	<u> </u>	mvolts
15.3.5	Execute command:			
	FUSIBLE LINK SWITCHES OPEN.	60		(~;
		•		

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PARAGRAPH NO. 4.21

DETAILED FUNCTIONAL TESTS

		LOG A	HR OPE	7/500
PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
16.	Baffle Heater Test			
,	Connect a DVM across the Baffle Heater current TP's on the FTP. (1 volt equals 1 amp current flow).		V	(V)
16.1	Heater and Backup Off.			
16.1.1	Execute command:			
	BAFFLE HEATER CONTROLLER OFF/BACKUP OFF.	56		(1)
16.1.2	Verify via the CRT that digital			
	Word F bit 0 = 0			(5)
	bic 1 = 0.			(5)
1.3	Verify that the baffle heater current is ≤1 mA (≤1 mV reading on the DVM).	≤1	_0_	mvolts
16.1.4	Verify that analog telemetry			
	Channel 54 "Baffle Heater Current" is ≤1.0V.	≤1.0	0.0	volts
16.2	Baffle Heater Controller On.			
16.2.1	Execute commands:			
	BAFFLE HEATER CONTROLLER OFF/BACKUP OFF.	56		(4)
,	BAFFLE HEATER CONTROL ON.	54		(N)
16.2.2	Verify via the CRT that digital			
	Word F bit 0 = 1			(1)
'	bit 1 = 0.			(1)

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DETAILED FUNCTIONAL TESTS

		LOG A	HR OPER	7 1500
PARA OR STEP STEP	PROCEDUR: STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
16.2.3	Verify that the baffle heater current DVM is measuring ≤1 mV.	£ 1	_0_	mvolts
16.2.4	Using a DVM verify that test point J20-41 "Baffle Temp Error Test" is in the range 0 < V < lV.	0 < V < 1	.22	volts
	Using a DVM verify that test point J20-42 "Baffle Heater Current Test" is in the range 0 < V < .1V.	0 < V < .1	.02	volts
16.2.5	Remove resistor on FTP across Baffle Heater Input TP's and replace with 30000 ohms ("cold").		1	(V)
	Verify that the baffle heater current DVM is reading ≥300 mV.	≥300	620	mvolts
•	Verify that analog telemetry			
	Channel 54 is ≥2.5V.	≥2.5V	5.0	volts
	Using a DVM verify that test point J20-41 is in the range $2 < V < 15V$.	2 < V < 15	4.6	volts
	Verify that test point $J20-42$ is in the range $0.2 < V < 1V$.	.2 < V < 1	.62	volts
16.3	Heater and Backup On.			
16.3.1	Execute commands:			
	BAFFLE HEATER CONTROLLER OFF/BACKUP OFF.	56		(V)
	BAFFLE HEATER CONTROL ON.	54		(レ)
	BAFFLE HEATER BACKUP ON.	5 5		(~)
16.3.2	Verify via the CRT that digital			
	Word F bit 0 = 1	•		(~)

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E.M. MODULE UNIT TEST	Size	11323	16704
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PARAGRAPH NO. 4.21

DETAILED FUNCTIONAL TESTS

		LOG A	HR OPER	7500
PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(16.3.2)	bic 1 = 1.			(~)
16.3.3	Verify that the baffle current DVM is measuring 2300 mV.	≥300	<u>330</u>	mvolts
16.3.4	Verify that analog telemetry			
	Channel 54 is ≥2.5V.	≥2.5	3.74	volts
16.4	Baffle Temperature Telemetry.			
16.4.1	Execute command:			
	DC RESTORE OFF/TELEMETRY SCALING OFF.	6		
16.4.2	Verify via the CRT that analog telemetry			
ļ	Channel 69 "Baffíe Temperature" 1s ≤1.0V	≤1.0		volts
1 -6.4.3	Execute command:			
	TELEMETRY SCALING ON.	7		(5)
	Verify that analog telemetry			
}	Channel 69 is ≥2.5V.	22.5	5.0	volts
16.4.4	Remove resistor on FTP across TP's 4 and 10 and replace with 30000 ohms.			(5)
	Verify that analog telemetry	:		
	Channel 69 is ≤1.0V.	` ≤1. 0	00	volts
17.	Post Amplifier Tests			
17.1	Band 1			
17.1.1	Connect cables between Electronic Module connectors J30 and breakout boxes and between J35 and breakout boxes. Verify			(~)

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		DATA SHEET NO. 36 OF 56	PARAGRAPH	NO4.2	1
		DETAILED FUNCTIONAL		HR OPE	R 1500
	PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
	(17.1.1	that test cable 45 is connected between the EM and the FTP.		/	(/)
		Connect cable between Multiplexer output connectorJ2 and breakout box.			
		Short all unused signal inputs of Band l to their respective signal returns [(15 of 16 channels x(2 inputs (HI/L))) = 30 shorts]. Short all signal returns to power return.	o f	<i>S</i>	(L)
		Verify via the CRT that digital			
		Word G bit 2 = 1. B bit 0 = 1.			
	17.1.2	Connect Pl1 and Pl2 (from the EM) and Jl2 and Jl2 Extender cables (from the MUX) into the MUX Channel Selector box. Selecthe output channel via the MUX Channel Selector keyboard.			(v)
		Connect breakout box between EM connector P13 and MUX connector J13. Using the test Equipment configuration shown in Figure 4.19, connect the DC Restore Sync signal on P13-H3/H4 (breakout box PINS 38 and 39) to the "inhibit" input of the phase splitter and to the triggers of bot oscilloscopes.	3		(v)
	17.1.3	Set the function generator at 1KHz.			
		Adjust the sineway so than it is all positive relative to the DC Restore level and it has an amplitude of 4Vp-p out of the postamps.			
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PARAGRAPH NO. 4 21

DETAILED FUNCTIONAL TESTS

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PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
17.4	Connect function generator to consecutive input connector pins as defined on the following Band 1 1000 Hz table. Record related multiplexer output amplitude levels in Actual Data column of the Band 1 1000 Hz table for all 16 channels.		\ 	(.
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E.M. MODULE UNIT TEST A 11323 16704

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PARAGRAPH NO. 4.21.17.1

AND 1	PARAMETER Input Since Freq = 100		ve Hz	Input	Signal Ret	Multi- plexer Output	Max Input Reference Spec Limit	Max Ousput Spec Limit	Actual Data	Units
	Channel	1	HI	J30-C3	J30-C4		4 (t 35) ypp	94442.2	2.0	∇p-p
]			Le	J3C-C5	J30-C4	J2-10		V p - p		
		2	HI	J35-K3	J35-K4	11			2.0	
			LO	J35-K5	J35-K4	11			4.0	
		3	HI	J30-D3	J30-D4	12			2.0	
			LO	J30-D5	J30-D4		<u> </u>		10.0	
}		4	HI	J35-J53	J35-J4	13			2.0	
L			LO	J35-J <i>X</i> S	J35-J4		·		1 0.	<u> </u>
		5	HI	J30-E3	J30-E4	14			20	
			LO	J30-E5	J30-E4		l		a.0	
		6	HI	J35-H53	J35-H4	15			2.0	j
			LO	J35-H25	J35-H4		i		a.0	
		7	HI	J30-F3	J30-F4	16	i		1 4 _	
			LO	J30-F5	J30-F4				2.0	
		8	HI	J35-G3	J35-G4	.17			9 -	
ı			LO	J35-G5	J35-G4	·• ·			2.0	
i		9	HI	J30-G3	J30-G4	18				
<u> </u>			LO	J30-G5	J30-G4		C.,		2.0	
		10	HI	J35-F3	J35-F4	19			0	
			LO	J35-F5	J35-F4		!		2.0	
		11	HI	J30-H3	J30-H4	20			3	
<u> </u>			LO	J30~H5	J30-H4		!		2.0	}
		12	HI	J35-E3	J35-E4	21	1		ĺ	
			Le	J35-E5	J35-E4		1		2.0	
		13	HI	J30-J3	J30-J4	22				İ
			LO	J30-J5	J30-J4				12.0	
		14	HI	J35-D3	J35-D4	23				
			LO	J35-D5	J35-D4				2.0	
1		15	HI	J30-K3	J30-K4	24			0	
			LO	J30-K5	J30-K4				2.3	
		16	HI	J35-C3	J35-C4	72.25	4(=3%,100	1844422	1 /	Ī
1			LO	J35-C5	J35-C4	J2-25	ļ	V p - 1	2.0	Ab-b

Output Return J2-61

CODE IDENT NO SIZE NUMBER 11323 Δ. 16704 SCALE REV & SHEET

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DATA SHEET NO. 39 OF 56

PARAGRAPH NO. 4.21

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1500

		LUG A	HK UPE	7/200
PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
17.2	Band 2			
17.2.1	Connect cables between Electronics Module connector J31 and breakout boxes and between J36 and breakout boxes. Verify that test cable 45 is connected between the EM and the FTP.			()
	Short all unused signal inputs of Band 2 to their respective signal returns [15 of 16 channels x(2 inputs (HI/LO)) = 30 shorts]. Short all signal returns to power return.		L	(V)
	Verify via the CRT that digital Word B bit 1 = 1. G bit 2 = 1.			(5)
_,.2.2	Connect P11 and P12 (from the EM) and J11 and J12 Extender cables (from the MUX) into the MUX Channel Selector box. Select the output channel via the MUX Channel Selector Keyboard.		V	('P')
	Connect breakout hox between EM connector P13 and MUX connector J13. Using the test Equipment configuration shown in Figure 4.19, connect the DC Restore Sync. signal on P13-H3/H4 (breakout box pins 38 and 39) to the "inhibit" input of the phase splitter and to the triggers of both oscilloscopes.		<u></u>	(v')
	Set the function generator at 1 KHz. Adjust the			
	sinewave so that it is all positive re-			

EST	ENGINEER		LIVERD		DATE 28		QA
E. M.	MODULE	UNIT	TEST	SIZE	11323	NUMBER 16	704
				SCALE	SEA	SHI	eer fig

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DATA SHEET NO. 40 OF 56

PARAGRAPH NO. 4.21

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1500

			HK OFE	\-
PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(17.2.3	an amplitude of 4Vp-p <u>out of</u> the postamps.			(1
17.2.4	Connect function generator to consecutive input connector pins as defined on the following Band 2 1000 Hz table. Record related multiplexer amplitude levels in Actual Data column of the Band 2 1000 Hz table for all 16 channels.	·		() / (
	·			
				٠

EST	ENGINEER		~ C1 W		DATE &	danslyz.	QA 2
E. M.	MODULE	UNIT	TEST	A	11323	167	' 04
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ATA	ATA SHEET NO. 41 of 56					PARAGRAPH NO. 4.21					
AND 2	PARAMETE Input Si Freq = 1	newa	ve Hz	Input	Signal Ret	Multi- plexer Output	Mux Input Reference Spec Limit	M ve Output Spec Limit	Actual Data	Unit	
	Channel	1	HI	J31-C3	J31-C4		4 (437) 400	1844422		Vp-	
			LO	J31-C5	J31-C4	J2-27		7 p − p	<i>2.</i> ၁		
		2	HI	J36-K3	J36-K4	_			_		
			LO	J36-K5	J36-K4	28			2.1		
		3	HI	J31-D3	J31-D4						
			LO	J31-D5	J31-D4	29			2.3		
		4	HI	J36-J3	J36-J4				^ -	Ī	
			LO	J36-J5	J36-J4	30			2-0		
		5	HI	J31-E3	J31-E4	31			^	Ī	
			LO	J31-E5	J31-E4		ĺ		2.5		
		6	HI	J36-H3	J36-H4				<u> </u>	1	
			LO	J36-H5	J36-H4	32			2.5		
		7	HI	J31-F3	J31-F4					1	
			LO	J31-F5	J31-F4	. 33			ه له		
	1	8	HI	J36-G3	J36-G4				2.0	Ī	
			LO	J36-G5	J36-G4	. 34			۵- ک		
		9	HI	J31-G3	J31-G4.				0		
			LO	J31-G5	J31-G4	35			2-0	<u> </u>	
		10	HI	J36-F3	J36-F4				2 >	1	
			LO	J36-F5	J36-F4	36			2.0		
		11	HI	J31-H3	J31-H4				B		
V			LO	J31-H5	J31-H4	37			2.0		
		12	HI	J36-E3	J36-E4			i	4		
			LO	J36-E5	J36-E4	38			2.0		
	 	13	HI	J31-J3	J31-J4			1	^		
			LO	J31-J5	J31-J4	39			2-0		
		14	HI	J36-D3	J36-D4						
			Le	J36-D5	J36-D4	40	İ		2.0	_	
		15	HI	J31-K3	J31-K4				0	1	
			LO	J31-K5	J31-K4	41			2.0		
		16	HI	J36-C3	J36-C4		4(=3%)٧23	1.8 < Y < Z.2	80		
			Le	J36-C5	J36-C4	J2-42		Vp-p	i 2	∇p.	

SIZE CODE IDENT NO. NUMBER

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	DATA SHEET NO. 42 OF 56	PARAGRAPH	NO. 4.21								
DETAILED FUNCTIONAL TESTS LOG AHR OPER 1500											
PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS							
17.3	3and 3										
17.3.1	Connect cables between Electronics Module connectors J32 and breakout boxes and between J37 and breakout boxes. Verify that test cable 45 is connected between the EM and the FTP.			(/)							
	Short all unused signal inputs of Band 3 to their respective signal returns [15 of 16 channels x(2 inputs (HI/LO)) = 30 shorts]. Short all signal returns to power return.		<u> </u>	(√)							
	Verify via the CRT that digital Word B bit 2 = 1. G bit 2 = 1.		\ <u>\</u> \\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	\$							
7.3.2	Connect P11 and P12 (from the EM) and J11 and J12 Extender cables (from the MUX) into the MUX Channel Selector box. Select the output channel via the MUX Channel Selector Keyboard.		<u> </u>	(/)							
	Connect breakout box between EM connector P13 and MUX connector J13. Using the test Equipment configuration shown in Figure 4.19, connect the DC Restore Sync. signal on P13-H3/H4 (breakout box pins 38 and 39) to the "inhibit" input of the phase splitter and to the triggers of both oscilloscopes.		<u> </u>	(d)							
17. 3.3	Set the function generator at 1 KHz.										
	Adjust the sinewave so that it is all positive re- lative to the DC Restore level and it has			-							
TEST ENGINEER LANGE DATE 28 dan't QA											
E.M. MODULE UNIT TEST A 11323 16704											

PORM HO 3132 ' A 3-491 SIETERICH-POST CLEARPRINT COOM

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PARAGRAPH NO. 4.21 DATA SHEET NO. 43 OF 56 DETAILED FUNCTIONAL TESTS LOG AHR OPER 1500 PARA OR STEP SPEC RECORD DATUM / | UNITS OR PROCEDURE STEP COMMAND VERIFY NO (17.3.3) an amplitude of 4Vp-p out of the postamps. (V) 17.3.4 Connect function generator to consecutive input connector pins as defined on the following 3 and 3 1000 Hz table. Record related multiplexer amplitude levals in Actual Data column of the Band 3 1000 dz (**/**) 1 table for all 16 channels. DATE ZXCHIN'S EST ENGINEER L CODE CENT NO. SIZE 16704 11323 E.M. MODULE UNIT TEST A SHEET SCALE

FORM HO. 3122 " A 15-691 SIETERICH-HOST CLEARPRINT COUR

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DATA	SHEET 4	4 of 56			PAGE IS QUALITY	•	PARAC	GRAPH NO.	.21	
SAND	PARAME!				•	Multi-	Mux Input	Mux Output		
3	Input		ve		Signal	plexer	Reference		Actual	
	Freq =	1000	Ηz	Input	Ret	Output	Spec Limit		Data	Units
	Channe	1 1	HI	J32-C3	J32-C4	J2-44	4(23%, VPP	18 4 V = 2 2 Vp-p	2.0	Vp-p
			LO	J32-C5	J32-C4			· P P	100	
		2	HI	J37-K3	J37-K4	45			2 🔿	
			LO	J37-K5	J37-K4				2.0	
		3	HI	J32-D3	J32-D4	46			2,0	
		<u> </u>	LO	J32-D5	J32-D4				α, -	
		4	HI	J37-J3	J 37-J4	47			6,2	
i			LO	J37-J5	J37-J4				1 4.0	Ì
		5	HI	J32-E3	J32-E4	48			2.5	
			LO	J32-E5	J32-E4				1 4.0	<u> </u>
		6	HI	J37-H3	J37-H4	49			2. 0	
			LO	J37-H5	J37-H4				0.0	
		7	HI	J32-F3	J32-F4	50			2 -	
			LO	J32-F5	J32-F4	·			2.3	
		8	HI	J37-G3	J37-G4	51		ja.	2.0	
			LO	J37-G5	J37-G4			*****	a. v	1
		9	HI	J32-G3	J32-G4	52			2,0	1
 			LO	J32-G5	J32-G4				100	
		10	ΗI	J37-F3	J37-F4	53			10-	l
		·	LO	J37-F5	J37-F4				2.0	
		11	HI	J32-H3	J32-H4	54			1 1 -	
			LO	J32-H5	J32-H4				2.0	
		12	HI	J37-E3	J37-E4	55			12	1
			LO	J37-E5	J37-E4				2.0	
		13	HI	J32-J3	J32-J4	56			2.0	Ì
			LO	J32-J5	J32-J4				1.5	<u> </u>
		14	HI	J37-D3	J37-D4	57			2.0	
			LO	J37-D5	J37-D4	,			1 0.0	<u> </u>
		15	HI	J32-K3	J32-K4	58			2.1	
	<u></u>		LO	J32-K5	J32-K4				α · Ι	<u> </u>
		16	HI	J37-C3	J37-C4	J2-59	_	184 V 4 2.2 Vp-p-	2.0	
			LO	J37-C5	J37-C4		4(=37,)VP-0	Vp-p -	1 4.5	Vp-p
					0 u	tput Ret	urn			
						12-61				

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	SCALE	REV '	SHEET 13

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	DATA SHEET NO. 45 OF 56	PARAGRAPH	NO. 4.21	-
	DETAILED FUNCTIONAL		HR OPEI	2/500
PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
17.4	Band 4			
17.4.1	Connect cables between Electronics Module connectors J33 and breakout boxes and between J38 and breakout boxes. Verify that test cable 45 is connected between the EM and the FTP.		<u> </u>	(/)
	Short all unused signal inputs of 3 and 4 to their respective signal returns [15 of 16 channels $x(2 \text{ inputs } (HI/LO)) = 30 \text{ shorts}]$. Short all signal returns to power return.			(/)
	Verify via the CRT that digital Word B bit 3 = 1. G bit 2 = 1.		<u> </u>	()
7.4.2	Connect P11 and P12 (from the EM) and J11 and J12 Extender cables (from the MUX) into the MUX Channel Selector box. Select the output channel via the MUX Channel Selector Keyboard.		· 	(~)
17. 4 3	Connect breakout box between EM connector P13 and MUX connector J13. Using the test Equipment configuration shown in Figure 4.19, connect the DC Restore Sync. signal on P13-H3/H4 (breakout box pins 38 and 39) to the "inhibit" input of the phase splitter and to the triggers of both oscilloscopes. Set the function generator at 1 KHz.		<u></u>	(V)
	Adjust the sinewave so that it is all positive re-lative to the DC Restore level and it has			

TEST ENGINEER	DATE 28 NAN'S QA
E.M. MODULE UNIT TEST	A 11323 NUMBER 16704
	SCALE REV 2 SHEET -4

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DATA SHEET NO. 46 OF 56

PARAGRAPH NO. 4.21

DETAILED FUNCTIONAL TESTS

LOGAHR OPER 1500

		LUG A	AR OPER	1200
PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(17.4.3)an amplitude of $4Vp-p$ <u>out of</u> the postamps.		<u></u>	(/)
17.4.4	Connect function generator to consecutive input connector pins as defined on the following Band 4 1000 Hz table. Record related multiplexer amplitude levels in Actual Data column of the Band 4 1000 Hz table for all 16 channels.			S
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			<u> </u>	

TEST ENGINEER JOUVION	DATE 28 NAVYZ CA	
E.M. MODULE UNIT TEST	A 11323 16704	
	SCALE REV C SHEET 5	

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DATA	SHEET	47	of 56
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PARAGRAPH NO. 4.21

PARAMETER Input Sinewa Freq = 100	ve Hz	Input	Signal Ret	Multi- plexer Output	Mux Input Reference Spec Limit	Mux Output Spec Limit	Actual Data	Unit
Channel 1	ні	J33-C3	J33-C4		4(:3%)VPP	1.8< V< 2.Z		Vp-
	LO	J33-C5	J33-C4	J3-12		Vp-p	2.5	
2	HI	J38-K3	J38-K4	13			100	
	LO	J38-K5	J38-K4				2.0	
3	HI	J33-D3	J33-D4	14				
	LO	J33-D5	J33-D4				2.0	
4	ΗI	J38-J3	J38-J4	15			1 2 -	
	LO	J38-J5	J38-J4				200	<u> </u>
5	HI	J33-E3	J33-E4	16			0	
	LØ	J33-E5	J33-E4	10			2.5	<u> </u>
6	HI	J38-H3	J38-H4	17			2.0	
	LO	J38-H5	J38-H4				α. σ	
7	HI	J33-F3	J33-F4	18			10-	
	LO	J33-F5	J33-F4				2.0	<u> </u>
8	HI	J38-G3	J38-G4	19		•	2.0	
	LO	J38-G5	J38-G4	<u> </u>	-		α.	1
9	HI	J33-G3	J33-G4	20			2.0	
	LO	J33-G5	J33-G4				10.0	<u> </u>
10	HI	J38-F3	J38-F4	21			2.0	
	LO	J38-F5	J38-F4				10.0	<u> </u>
11	HI	J33-H3	J33-H4	22	1		2.0	1
	LO	J33-H5	J33-H4		<u> </u>		7.0	<u>i</u>
12	HI	J38-E3	J38-E4	23			2.0	į
	LO	J38-E5	J38-E4				10.	
13	HI	J33-J3	J33-J4	24			2.0	1
	LO	J53-J5	J33-J4				 	
14	HI	J38-D3	J38-D4	25	1		12.	
	LO	J38-D5	J38-D4		 		2.0	
15	HI	J33-K3	J33-K4	26	'		2.0	
	LO	J33-K5	J33-K4		<u> </u>		1	
16	HI	J38-C3	J38-C4	J3-27	4(=3%)VPP	1844422	2.5	1
	LO	J38-C5	J38-C4		: 1	Vp-p	I ~ . ```	Vp-2

SIZE CODE IDENT NO NUMBER
A 11323 | 16704

SCALE | REV 2 | SHEET 16

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DATA SHEET NO. 47 OF 56

PARAGRAPH NO. 4.21

1	DETAILED FU	NCTIONAL		HR OPE	7 /500
PARA OR STEP NO.	PROCEDURE STE	D		RECORD DATUM /	
17.5	Band 5			·	
17.5.1	Connect cables between Electro connectors J41 and breakout bo that test cable 45 is connecte the EM and the FTP.	xes. Verify			(<i>F</i>)
	Short all unused signal inputs to their respective signal retained channels x(2 inputs (HI/LO) shorts]. Short all signal retained return.	uras [15 of) = 30		<i>y</i>	(レ)·
	Verify via the CRT that digital Word 3 bit 4 = 1. G bit 2 = 1.	1		- 5 -	(V) (V)
7.5.2	Connect Pll and Pl2 (from the and Jl2 Extender cables (from into the MUX Channel Selector the output channel via the MUX Selector Keyboard.	the MUX)			(4)
	Connect breakout box between E: P13 and MUX connector J13. Us Equipment configuration shown 4.19, connect the DC Restore S on P13-H3/H4 (breakout box pinto the "inhibit" input of the ter and to the triggers of bot scopes.	ing the test in Figure ync. signal s 38 and 39) phase split-	-	./	<u>.</u>
17.5.3	Set the function generator at A sinewave so that it is all pos lative to the DC Restore level	ijust the itive re-			
EST	ENGINEER JOUTUR	الكنا فيهيه والبرسان برمية السنا	29 NANY2	- QA _	
E. M.	MODULE UNIT TEST	A 113		16704	
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DATA SHEET NO. 49 OF 56 PARAGRAPH NO. 4.21 DETAILED FUNCTIONAL TESTS LOG AHR OPER 1500 PARA CR RECORD SPEC DATUM / UNITS PROCEDURE STEP OR COMMAND VERIFY (17.5.3) an amplitude of 4Vp-p out of the postamps. 17.5.4 Connect function generator to consecutive input connector pins as defined on the following 3 and 5 1000 Hz table. Record related multiplexer amplitude levels in Actual Data column of the Band 5 1000 Hz table for all 16 channels. EST ENGINEER DATE 23 16704 11323 Α E.M. MODULE UNIT REV SHEET SCALE

PORM HO. 3122 1'A 3-68' DIETERICH-MOST CLEARMENT COOM

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PARAGRAPH NO. 4.21

RAND 5	PARAMETER Input Sinewa Freq = 1000	ve Hz	Input	Signal Ret	Multi- plexer Output	Mux Input Reference Spec Limit	Mux Cufpit Spec Limit	Actual Data	Units
	Channel 1	HI	J41-W1	J41-P4	J3-29	4(±3%) IPP	: 3<4<2.2	2.0	V p−p
<u> </u>		LO	W2			<u> </u>	Vp-p	α. σ	
	2	HI	W4		30			2.0	
		Lo	W5			1		2.5	
1	3	HI	₩3		31	!	1	4	
		LO	W3			<u>!</u>		2.5	
1	4	HI	U 4		32			2.	
		LO	U 5					2.0	
	5	HI	Tl		33			0.0	
		LO	Т2			ļ		2.0	
	6	HI	R4		34			2.0	
<u> </u>		LO	R5	· · · · · · · · · · · · · · · · · · ·		<u> </u>			
	7	HI	T 3		35			2.0	
ļ		LO	U 3	····				2.0	
	8	HI	T4		36			2.0	
1		LO	Т5	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	—		<u> </u>	α. σ	
	9	HI	Sl		37			2.0	
		LO	S 2					\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	
	10	HI	\$3		38			20	
<u> </u>		LO	R3			<u> </u>		0.0	
1	11	HI	R1		39			2.0	
 		LO	P1				!	1 0.0	
1	12	HI	N1		40			2.0	
		LO	N 2				!		!
}	13	HI	MI		41			2.0	
		LO	L1				1		1
	14	HI	M4		42			2.0	
	1.5	LO	N 4			<u> </u>	1		
	15	HI	L3		43			25	
}		LO	м3				1	 	
	16	HI	L4	161 77	J3-44	41:37) VPO	1.2 <v <z="</td"><td>2.0</td><td>\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \</td></v>	2.0	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \
1		LO	J41-L5	J41-P4			Vp-p		' Vp-p

Output Return

SIZE CODE IDENT NO NUMBER

A 11323 16704

SCALE REV 1 SHEET 12

CORM NO 3122 1 A 1-881 DISTRICH - POST C. SARREIMT DOCK

OF <u>56</u> DATA SHEET NO. 51

PARAGRAPH NO. 4.21

DETAILED FUNCTIONAL TESTS

			LOG A	HR OPER	7/500					
•	PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY						
	17.6	Band 6								
	176.1	Connect cables between Electronics Module connectors J40 and breakout boxes. Verify that test cable 45 is connected between the EM and the FTP.	,	~	(Y)					
:		Short all unused signal inputs of Band 6 to their respective signal returns [3 of 4 channels x(2 inputs (HI/LO)) = 6 shorts]. Short all signal returns to power return.		V	(h)					
		Verify via the CRT that digital								
		Word B bic 5 = 1. G bic 2 = 1. L bit 0 = 1.		V	(V)					
•	7.6.2	Connect P11 and P12 (from the EM) and J11 and J12 Extender cables (from the MUX) into the MUX Channel Selector box. Select the output channel via the MUX Channel Selector Keyboard.	-		(V)					
		Connect breakout box between EM connector P13 and MUX connector J13. Using the test Equipment configuration shown in Figure 4.19, connect the DC Restore Sync. signal on P13-H3/H4 (breakout box pins 38 and 39) to the "inhibit" input of the phase splitter and to the triggers of both oscilloscopes.		<u>~</u>	(V)					
	17.6.3	Set the function generator at 1 KHz.								
	Adjust the sinewave so that it is all positive re- lative to the DC Restore level and it has									
	EST E	ENGINEER LINES DATE	25-low't	= QA _						
	FM:	MODULE UNIT TEST A 113		16704						

SCALE REV SHEET

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		DATA SHEET NO. 52 OF 56	PARAGRAPH	NO. 4 - 21	
		DETAILED FUNCTIONAL		HR OPE	R1500
	PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM/	
	(17.6.	lan amplitude of $4Vp-p$ out of the postamps		V	(1)
	17.6.4	Connect function generator to consecutive input connector pins as defined on the following 3 and 6 1000 Hz table. Record related multiplexer amplitude levels in Actual Data column of the 3 and 6 1000 Hz table for all 16 channels.			(24)
		•		·	•
	EST	ENGINEER DAT	E <u>12 /m 3</u>	≧ QA_	
		MODULE UNIT TEST A 11	323 NUMBER	16704	
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DATA SHEET 53 of 56

PARAGRAPH NO. 4.21

AND 6	PARAMETER Input Sinewa Freq = 1000	ve 'Hz Inout	Signal Ret	Multi- plexer Output	Mux Input Reference Spec Limit	Mox Output Spec Limit	Actual Deta	Units
		HI J40-M1 LO N1	J40-J1	J2-5	4 (= 3%) VPP	^ b-b . 18< ^< 5 5	2.0	Vp-p
	2	HI M2 LO N2		6			2.0	
		HI M3		7	·		2.0	
	4	HI M4 LO J40-N4	J40-J1	J2-8	4(237j) VPF	1.2 < V < Z.Z ,Vp-p	12.0	Vp− p

Output Return

J2-61

SIZE CODE IDENT NO NUMBER

A 11323 . 16704

SCALE REV : SHEET 222

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DATA SHEET NO. 54 OF 56

PARAGRAPH NO. 4.21

	DATA SHEET NO. 34 OF 36	PARAGRAPH	NO.	-
	DETAILED FUNCTIONAL		HR OPE	7 1500
PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
17.7	3and 7			
17.7.1	Connect cables between Electronics Module connector J42 and breakout boxes. Verify that test cable 45 is connected between the EM and the FTP.			(✔)
	Short all unused signal inputs of 3 and 7 to their respective signal returns [15 of 16 channels x(2 inputs (HI/LO)) = 30 shorts]. Short all signal returns to power return.			(V)
	Verify via the CRT that digital Word 3 bit 6 = 1. G bit 2 = 1.		7	\\\
7.7.2	Connect P11 and P12 (from the EM) and J11 and J12 Extender cables (from the MUX) into the MUX Channel Selector box. Select the output channel via the MUX Channel Selector Keyboard.			(v /)
	Connect breakout box between EM connector P13 and MUX connector J13. Using the test Equipment configuration shown in Figure 4.19, connect the DC Restore Sync. signal on P13-H3/H4 (breakout bcX pins 38 and 39) to the "inhibit" input of the phase splitter and to the triggers of both oscilloscopes.		· .	· (1/2)
17.7.3	Set the function generator at 1 KHz.			
	Adjust the sinewave so that it is all positive re-lative to the DC Restore level and it has			
EST	ENGINEER Months DATE	29-/Ani 42	= QA _	
E. M.	MODULE UNIT TEST A 113		16704	
	SCALE	læv 💍	SHEET TO B	

		V			
	DATA SHEET NO. 55	OF_56_	PARAGRAPH	NO. <u>4.21</u>	-
	DETAILED	FUNCTIONAL		HR OPEI	R 1500
PARA OR STEP NO.	PROCEDURE S	STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
)an amplicude of 4Vp-p <u>out</u>				(K)
17 7 - 4	Connect function generator input connector pins as defollowing Band 7 1000 Hz talelated multiplexer amplituated Data column of the table for all 16 channels.	fined on the ble. Record ude levels in			(V)
			·		
		٠			
,FGT (ENGINEER Source	DATE	29 C/AN'Y	ン QA _	7,
	MODULE UNIT TEST	SIZE CODE -06	MT WO MUMBER	16704	
*G1m =Q. 3133 ·	S-691 DIETERICH-POST CLEARPEINT COOR	SCALE	\$54 J	ISHEET ZOL	1



DATA SHEET 50 of 56

PARAGRAPH NO. 4.21

AND	PARAMETER				Multi-	MUL INDET	MUX OUTPUT		
_	Input Sine		_	Signal	plexer	Reference	Spec	Actual	
7	Freq =		z Input		Output		,	Data	Units
	Channel 1	HI	J42-W1	J42-P4	J3-45	41=3%)VPP	184455	2.0	Vp-p
		LO	W2				Vp-p	α	
	2	HI	W4					4	
		LO	WS		46			2.0	1
	3		٧3						
	, ,		\$		47			2.0	
	<u></u>	LO	W3						
	4	HI	U 4		48			2.0	1
		LO	US					<i>a.</i> 0	
	5	HI.	Tl		49	ļ		, , ,]
		LO	T2		4,9			2.5	1
	6		R4						
			R5		50			2.5	j
		LO	1					<u> </u>	
	7		T3		51			20	
		LO	<u>U3</u>					i	
	8	HI	T4		52			2.0	1
		LO	T 5					2.0	
	9	HI	\$1					0	
		LO	S 2		53			2.0	1
	10		\$3					i	
	10		1		14			2.5]
		LO	R3						
	11	HI	R1		5.5		1	2.0	1
		LO	P1					:	
	12	HI	N1	,	56			1 - !	. 1
		LO	N 2		9.0			2.0	
	13		М1						
	1	LO	L1		57		- 1	2.0	
			 					 -	
	14		M4		58		ĺ	2.0	
		LO	N 4						
	15	HI	L3		59			2.0	
		LO	. жз					0:-	
	16	HI	L4						
	1	LO	J42-L5	J42-P4	J3-60	-1==%) VFA	1844472	2.5	∀p- p
		20			tput Ret	• 1	√ p − p	2. 5	ין עייע ע ו
				่อน	13-11 J			}	
							······································		<u>.</u>

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SIZE	ON THIS 1900	NUMBER			
Α	11323	1	167	704	
SCALE	₹ € ∀ :	2	SHEET	225	

DATA SHEET NO OF _4_

PARAGRAPH NO. 4.22

DETAILED FUNCTIONAL TESTS

<u></u>	DETAILED FUNCTIONAL	LOG A	HR OPE	R 1500
PARA OR STEP NO.	PROCEDURE STEP		RECORD DATUM / VERIFY	
(4.22)	Ambient Board Temperature Checks	,		
1.	For the 23 boards listed below use a Fluke 80T-150°C Temperature Sensor connected into a Fluke 8030A Digital Multimeter to measure temperature at top portion of each board heat sink. One measurement shall be made at left side of board heat sink, while another measurement shall be made at right side of board heat sink.		,	
	Left Al Scan Line Corrector 52250-1	<50	2多7	°c
	Right Al Scan Line Corrector 52250-1	<50	24.8	٥c
	Left A2 Scan Line Corrector 52250-2	<50	23.6	°C
	Right A2 Scan Line Corrector 52250-2	< 50	23.7	٥c
•	Left A3 Cal Lamp/Inchworm Driver 50926	< 50	23.5	٥c
	Right A3 Cal Lamp/Inchworm Driver 50926	< 50	23.5	٥c
Ì	Left A4 Temperature Controller 50942	< 50	<u> 23.3</u>	°C
	Right A4 Temperature Controller 50942	< 50	23.3	°C
	Left A5 Temp Control/DC Restore 50920	<50	23.6	°C
	Right A5 Temp Control/DC Restore 50920	<50	23.6	°C
	Left A6 Main Cal Shutter 50916	< 50	23.9	°c
	Right A6 Main Cal Shutter 50916	< 50	24.0	°C
	Left A7 Backup Cal Shutter 51398	<50	23.7	°C
	Right A7 Backup Cal Shutter 51398	< 50	23.7	°C
	Left A8 Telemetry Scaling/Baffle Heater 51402	< 50	25.1	°C
	Right A8 Telemetry Scaling/Baffle Heater 51402	< 50	25.3	°C
	Left A9 Motor Drive 50932	< 50	23 2	°C
	Right A9 Motor Drive 50932	< 50	23.2	°C

EST	ENGINEER	Borach.		DATE 1/2	9/8_ QA	
E.M.	MODULE	UNIT TEST	SIZE	11323	16704	
			SCALE	SEA (SHEET 114	

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DATA SHEET NO. 2 OF 4 PARAGRAPH NO. 4.22

DETAILED FUNCTIONAL TESTS

		LOG A	HR OPER	1500
PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(1.)	Left AlO Serial Magnitude Command 50900 Right AlO Serial Magnitude Command 50900 Left All Verification Register 50948 Right All Verification Register 50948 Left Al2 Macro Discrete Command	<50 <50 <50 <50	24.3 24.3 24.3 24.3	°c °c °c
	Generator 1A 51795 Right Al2 Macro Discrete Command Generator 1A 51795	<50 <50	23.6	°C
	Left Al3 Macro Discrete Command Generator 1B 51795 Right Al3 Macro Discrete Command	<50	<u>23.4</u> 23.4	°c
	Generator 18 51795 Left A14 Macro Discrete Command Generator 2 51813	<50 <50	23.6	°c °c
	Right Al4 Macro Discrete Command Generator 2 51813 Left Al5 Post Amplifier Band 7 50908	<50 <50	23.7	°c °c
	Right Al5 Post Amplifier Band 7 50908	<50	24.2	oc
	Left Al6 Post Amplifier Band 6 50912	< 50	23.5	°c
	Right Al6 Post Amplifier Band 6 50912	< 50	23.5	°C
	Left A17 Post Amplifier Band 5 50908	< 50	26.8	°C
	Right Al7 Post Amplifier Band 5 50908	<50	26.8	°c °c
	Left Al8 Post Amplifier Band 4 50904 Right Al8 Post Amplifier Band 4 50904	<50 <50	27.7 28.6	°C
	Left Al9 Post Amplifier Band 3 50904	< 50	29.3	°c
	Right Al9 Post Amplifier Band 3 50904	<50	29.2	°C
	Left A20 Post Amplifier Band 2 50904	<50	30.0	°c
	Right A20 Fost Amplifier Band 2 50904	< 50	29.6	°c
		•		

EST	ENGINEER		Borock		DATE _	1/29/82	QA
E.M.	MODULE	UNIT	TEST	SIZE	11323		16704
				SCALE	₹ 8 €	v :	SHEET 207

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DATA SHEET NO. 3 OF 4

PARAGRAPH NO. 4.22

DETAILED FUNCTIONAL TESTS

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	4 1 1	0050	(20)
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		LOG A	IN OF LI	\
PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(1.)	Left A21 Post Amplifier Band 1 50904	<50	29.6	°C
(,	Right A21 Post Amplifier Band 1 50904	. <50	29.4	°C
	Left A22 Auxiliary Circuits 52797	<50	25.2	°C
	Right A22 Auxiliary Circuits 52797	<50	25.0	°c
	Left* A23 Capacitor/Relays 52930	< 50	22.9	°c
	Right* A23 Capacitor/Relays 52930	< 50	22.9	°C
2.	System Shutdown.			
	Execute commands:			
	COOLER INTERMEDIATE STAGE HEATER CONTROLLER OFF/HEATER DISABLED.	47		(🗸)
	SMA + 2 HEATER CONTROLLER OFF.	42		(~)
	SMA - 2 HEATER CONTROLLER OFF.	44		(V)
	BLACKBODY HEATER CONTROL OFF/BACKUP OFF.	24		(~)
	CFPA TELEMETRY OFF.	10		(V)
	CFPA HEATER CONTROL OFF.	1D		(~)
	COLD STAGE HEATER CONTROLLER OFF/ COLD STAGE OUTGAS HEATER DISABLED.	59		(~)
	MULTIPLEXER OFF (POWER SUPPLY 2).	3D		(1)
	DC RESTORE OFF/TELEMETRY SCALING OFF.	6	<u> </u>	(1)
	BAFFLE HEATER CONTROLLER OFF/BACKUP OFF.	56	~	(V)
	MULTIPLEXER OFF (POWER SUPPLY 1).	8		(V)
	CALIBRATION LAMP 1 OFF/OVERRIDE OFF.	16		(/)
	*A23 does not have a heat sink per se. Take measurement on right and left side of	•		
	board.			

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E.M. MODULE UNIT TEST A 11323 16704

SCALE REV SHEET 15

A NG 3122 " A S SF DIETERICH-POST CLEAPPRINT COOM

DATA SHEET NO. 4 OF 4

PARAGRAPH NO. 4.22

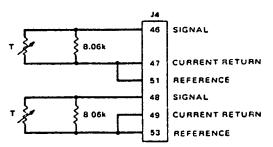
DETAILED FUNCTIONAL TESTS

-			LOG A	HR OPE	R_1500_	ĺ
	PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS	
	(2.)	CALIBRATION LAMP 2 OFF/OVERRIDE OFF.	17	7	(/)	
		CALIBRATION LAMP 3 OFF/OVERRIDE OFF	18		(V)	
		SHUTTERS OFF.	F		(1)	
		SCAN LINE CORRECTORS OFF.	4C		(1)	
		BAND 1 OFF.	26		(1)	
		BAND 2 OFF.	28		(1)	
		BAND 3 OFF.	2A		()	
		BAND 4 OFF.	2C		(V)	
		BAND 5 OFF.	2E		(/)	
ħ		BAND 6 OFF.	30		(V)	r
		BAND 7 OFF.	32		(V)	
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E. M.	MODULE	UNIT	TEST	A	11323	INUMBER	16704
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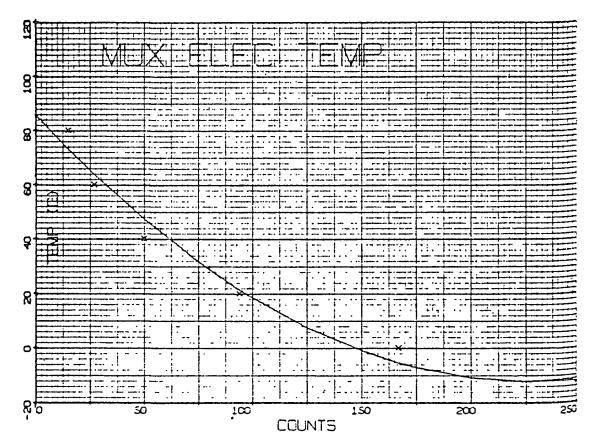
Channel monitors temperature of NRZ-L data output board of multiplexer two sensors are thermistors.



MULTIPLEXER ELECTRONICS TEMPERATURE

т	EMPERATURE, ºC	OHMS	COUNTS
	80 0000	318 7000	15
	60 0000	583 1000	27
	40 0000	1146.0002	50
	20 0000	2437.2002	94
	0.0000	5700,0009	167
	-13 3700	13169.9316	250

BEST LEAST - SQUARES FIT TEMPERATURE, °C = 0.85585E 02 + (-0.86264E 00) *COUNTS + (0.18992E -02) *COUNTS **2



EO 4237A DIL SHOET HS - Kn's

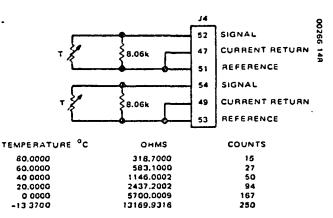
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MULTIPLEXER POWER SUPPLY TEMPERATURE

METER 055

CHANNEL MONITORS TEMPERATURE OF MULTIPLEXER POWER SUPPLY. TWO SENSORS ARE THERMISTORS.



BEST LEAST - SQUARES FIT TEMPERATURE, °C = 0.35585E 02 + (-0.86264E 00) 'COUNTS + (0.18992E -02) 'COUNTS ***2

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Appendix E

Electronics Module Performance Test

Part 2

Pre-Vibration Test Data

DATA SHEET NO. 1 OF 6 PARAGRAPH NO. 3.4

DETAILED FUNCTIONAL TESTS

		LOG A	HR OPE	R 600
PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(3.4)	CONNECTOR/PWB CONNECTOR CHECKOUT			
1.	Ground Continuity			
1.1	Test for continuity between all chassis grounds appearing at connectors J09 through J2S; P09-P13 (MUX connectors), P46 and P47 (Power Supply connectors); and XAO1 through XA22 PWB connectors.	Table 3.4A		(5)
1.2	Repeat for each of the following grounds:			
}	Power ground	Table 3.4A		(V)
	Signal ground	Table 3.4A		(~)
	Digital ground	Table 3.4A		(N)
I	Spacecraft Power ground	Table 3.4A	· /	(V)
	28V Return	Table 3.4A		(V)
	80V Return	Table 3.4A		(1)
	8V Return	Table 3.4A	<u> </u>	(V)
	Table 3.4A lists all connectors and identifies the ground pins of each type on each connector. Use extender cards to verify plug-in board connectors.			
2.	Ground Isolation			
2.1	Connect the Power Distribution Panel and the Bus Power Supply to P46, P47, J24 and J28 on the Electronics Module. Remove any shorting wires or equipment used in 3.4.1. (Be sure all AC cords are disconnected).			(~)

135- 151 EST ENGINEER DATE CODE IDENT NO 16704 11323 E.M. MODULE UNIT TEST A REV SHEET SCALE

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erminals E74/E141 s Ren Ren 80V Ren 29 A26E81	C3,	15,		···· , ··· • · · · · · · · · · · · · · ·					
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D181tul Gnd A26E04	7		3		1	136 1,92			
D181tu Gnd A26E04	A4,84 <i>C</i>		r	1,2, 1,91 179, 179,	85,86 - 127	2,4,2, 2,8,2,1	217		
<u>-</u>	₹				8 4 4 4 4	4 2 2 2	0 0	condition . Through	
GROUND PINS gnal Gnd		1	91,92,93,94° 91,92,93,94~ 2 4,121,122~						
CN CS/		8 1 1	,93, ,93,	·					
GROUND P Signal Gnd A26E02/E03		9,90,179,180 9,90,179,180 ,2, ,2,91,92	2,91,92,93,94, 2,91,92,93,94, 92, 94,121,122				1 2 2 2		
G G S 1 B A 2 6		90,17 2,50,17 2,91,9	* * 0 0			1, 7 8,1	50°, 50°, 49°, 49°, 52°,		
	<u>7</u>	89, 89, 1,2	1,2 1,2 91,			147	65, 3 - 2, 69, 50 - 1, 28, 49 - 1, 28, 49 - 51, 52, 57		
Gnd 101		90.00				1			
12.1	7	,91,	7			1		7 7	
Power A26	C4, G5 €	1,2,	706,68			† E		5,6 ° 13,14 °	•
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Cnd		126,150				•	•	77	
		172	, د			1		23,24	
Chassis		1100	7 0 8 4 9 9 9 9 9 9	70 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7		4 4 4	,	22.	\
Chi		5,84 5,84 31,1 50,8	4,90 + 2,180 + 92,180 + 92,180 + 92	14, 14, 93,		59.	-111-	• . •	, ,
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Connector	930 :	5 5 5 5 5 5 5 5 7	90 18 19 19	132	16 19 20 21		m 10 10 = 0	10	~
9	P46 P09 P10	F13 XA01 XA02 XA03 XA04	XXX	XA11 XA11 XA12 XA13	XA16 XA18 XA19 XA20 XA21	XA2 J09 J110 J111	113 115 116 117 120	.124 .125 .126	7
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•) boy	1 Auto	1 A	11323		16704		
			23/	SCALE	REV	<u> </u>	SHEET		
EM NO 2122 A 5 391) DIETERICH- PC1	ST CLEARPRINE TOOM	<u> </u>	A	1			·	

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Γ		45 mg 27				<u> </u>			
ا. ر ک	NNECTOR	+8V	+8V CDVU	(+21۷ عدد) -		+28V S/C	¥80V	-21V	+33∇
	XAG1	61,62		21,22	i-			23,24 ~	
	XA02	61,62		21,22	~			23,24 6	
	XA03			177,178	٧.			175,176	
	XA04			87,88,177,17	8 🗸		93,94 -	85,86 L 175,176	
	XA05			63,64# (iso);177	,178	113,114,	155,156	175,176; 65,65 (iso)	
	XA06	81,171 32,172		87,177 88,178	~				73,163 74,164
	XA07	81,171 82,172		87,177 88,178	~			85,175 86,176	
	KACS	13,14		47,48,177,1	78,	89,90, 167,168		43,44	,
-	XA09	13,14		87,88 ~				85,86-	15,105 r 16,106
	XA10		81,82 -			•			13,100
	XA11		81,82 ~					-	
	XA12								
-	XA13								
	XA14		81,82						161,162% 171,172
T	XA15			135,136 (Rtr	1:138)			47,137 ×*	
	XA16			113,114 (Rtn:		77,78		115,1164 25 26×*	
Ī	XA17			135,136 (Rtn:	138%	-	_	47,137 4	
	XA18			131,132 (Rtn:				133,1,3,44	
	XA19			131,132 (Rtn:	129) ւ			133,134	
	XA20			131,132 (Rtn:	129)			133,13,4	
	XA21			131,132 (Rtn:	129)	/		133,134,	
	XA22		5,6, ~ 95,96 ~						
\$-				19/81	R PIN	* B	Use S/C Rtns sam	Rtn 45 p e as +21V	oins 106,107
	*1716			1	A	11323	PARMU	1670+	-
- 1				140	ALE	REV	C	SHEET	

DATA SHEET NO. _2 OF 6

PARAGRAPH NO. 3.4

DETAILED FUNCTIONAL TESTS

		LOGA	HR OPER	700
PARA OR STEP NO.	PROCEDURE STEP		RECORD DATUM / VERIFY	
2.2	With all power supply switches on the Power Distribution Panel set to "ON", verify continuity within 2K ohms between the 30V MUX, 8V CDVU, 8V Radiometer, 33V Electromechanical, ±21V S/C Returns, +80V Rtns, and SMA Rtns.			(1)
2.3	Verify that the Isolation Resistance of the following Power Distribution Panel Returns is greater than 10 megohms with respect to the Unipoint ground:			-
	28V Bus (HP 62743 unit) Rtn.			(V)
	+19V Band 1 Rtn.			(N)
1	+19V Band 2 Rtn.			(1)
Ì	+19√ Band 3 Rtn.		v	(V)
	+19V Band 4 Rtn.			(r)
	+19V Band 5/7 Rtm.			
	+19V Band 6 Rtn.			()
2.4	Connect the Telemetry/Command Inter-			
	connection Unit (Module Test Set) to the Electronics Module via the proper cables (Primary inputs). Be sure all AC cords are disconnected.			(-)

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	UNIT TEST	SIZE	11323	NUMBER	16704
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DATA SHEET NO. 3. OF 6 PARAGRAPH NO. 3.4

DETAILED FUNCTIONAL TESTS

		LOG A	HR OPE	7 1.00
PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
2.5	Reverify that the isolation resistance of the following Power Distribution Panel returns is greater than 10 megohms with respect to the Unipoint ground:			
	28V Bus Rtn.			(1)
	+19V Band 1 Rtn.			(~)
	+19V Band 2 Rtn.			(V)
	+19V Band 3 Rtn.			(1/)
	+19V Band 4 Rtn.			()
	+19V Band 5/7 Rtn.			(レ)
	+19V Band 6 Rtn			('-')
	•			
2.6	Connect the Function Test Panel to the Electronics Module using the proper cables. Be sure all test points are disconnected and all switches are in the OFF position.			(~)
2.7	Reverify that the isolation resistance of the following Power Distribution Panel returns is greater than 10 megohms with respect to the Unipoint ground:			
	28V Bus Rtn.			(~)
	+19V Band 1 Rtn.			(~)
	<u> </u>	L	<u> </u>	

<u> E</u> ST	ENGINEER	_ 6m	26		_DATE = 2 3	14, DE	_ QA 1	172) 4
E. M.	MODULE	UNIT	TEST	Size A	11323	NUMBER	16704	
				SCALE	SEA	<u>ي</u>	SHEET	

	DATA SHEET NO. 4 OF 6	PARAGRA	PH NO. 3.4	_
	DETAILED FUNCTIONAL TEST	LOG AHR	OPER 602	<u>)</u>
ARA OR TEP	PROCEPURE STEP	SPEC OR COMMAND	RECORD DATUM/ VERIFY	UNITS
2.7)	+19V Band 2 Rtn. +19V Band 3 Rtn. +19V Band 4 Rtn. +19V Band 5/7 Rtn. +19V Band 6 Rtn.		\rightarrow \frac{1}{\sigma} \rightarrow \fra	() () () () () ()
•	Power to Ground Anti-continuity	(1		
3.1	Turn off all power supply switches. Disconnect all cables from the Electronic Module.	c s		(/)
	Unipoint the following ground points on A1A26 in the Electronics Module: E01, E	31.		(V)
	Connect unipoint ground to the LO side of a Weston 666 Meter Set to the LO OHMS scale.	f		
. 2	Module Verify that the following points have isolation greater than I megchm with respect to unipoint ground.			
	E08 8 vdc E19 +21 vdc E28 +33 vdc E80 +80 vdc E20 -21 vdc		- 	(2)(2)
.2.1.	GROUND SYSTEM ISOLATION. Verify that the following points have isolation greater than IMA with respect to each other.	e	:	
	A26F01 Power Ground (Module Unipoint	Ground)	<u> </u>	(~)
	Module Housing Chassis Ground A25T31-027 Spacecraft 28 V R	tn		(,)
EST E	NGINEER 16076 DATE DATE	h/ -	A ZOZ A Q	1 1/2/51
.M. M	l l	123	16704	
# MC 3/22 1	SCALE	LES _	SHEET :	2

DATA SHEET NO. __ OF __ PARAGRAPH NO. _3.4__ DETAILED FUNCTIONAL TESTS LOGAHR OPER LOS PARA SPEC RECORD OR UNITS PROCEDURE STEP OR DATUM / I STEP COMMAND VERIFY NO 3.3 Function Test Panel. Install all cables between the Function Test Panel and the Electronics Module (Be sure all AC cords (V) are disconnected). Module Test Set. Install cables between 3.4 the Module Fest Set and the Electronics Module. (Be sure all AC cords are dis-(V) connected.) Repeat 3.4.3.2. (V) Optional PWB Insertion. Carefully insert as many PWB Assemblies. All through A22. 3.5 as are available at this point in the test ing of the Electronics Module, and verify that no short circuits are present between the unipoints after each fwB is inserted. Wear a wristerat and observe Static Sensitive procedures when handling PWB (V) assemblies. 3.0 Power Supplies. Connect the Power Distribution Panel and the Bus Power Supply to the Electronics Module. Verify P46, 247, J24 that no short circuits exist between the 44 * 64 unipoints. DO NOT TURN ON ANY POWER. 3.7 Semove any and all PWB's inserted at Para 3.4.3.1 por Para 3.3.6. Disconnect connectors between the Function Test Panel (V) and the Electronics Medule. **4**. Pover Distribution. 4.1 Verify that the Module Test Set, Power Distribution Panel and Bus Power Supply are properly connected to the Electronics Module. 3 Det 1/ DATE EST ENGINEER CODE IDENT NO Silt 16704 11323 E.M. MODULE UNIT TEST Α STALE 1 224 SHEET

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DATA SHEET NO 5 OF _ 6 PARAGRAPH NO 3.4									
	DETAILED FUNCTIONAL TESTS LOG AHR OPER 600								
PARA OR STEP NO.	PROCEDURE STEP		RECORD DATUM/	UNITS					
	Insert Extender Cards 76447 in the PWB connectors.			(2)					
	Plug the test set and power supply AC cords into AC outlets.		<u></u>	(V)					
4.2	Complete the Module Test Set turn on procedure 3.3.7.2.			(~)					
4.3	Turn on primary power for the Power Distribution Panel/Bus Power Supply.			(V)					
	Turn on the individual power supplies via their front panel switches.			(1)					
			·	• ·					
4.4	Verify that power is present at all power pins listed in Table 3.4B.	Table 3.4B	<u></u>	W					
;									
: : !									
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	MODULE UNIT TEST A 113	•	16704						
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4.0 DETAIL PROCEDURE

4.1 TEST OBJECTIVE

To verify the function of the TM Electronics Module unit to commands. To verify that the digital telemetry corresponds to the commands given. To measure the analog voltage levels.

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	DATA SHEET NO. 1 OF 3	PARAGRAPH	NO. <u>4.3</u>	-		
	DETAILED FUNCTIONAL	TESTS LOG A	HR OPE	₹ <i>80</i> 0_		
PARA OR STEP NO.	PROCEDURE STEP		RECORD DATUM/			
. ((2)	Note: To Perform This Test Board A03- 50927 must be installed.					
(4.3)	INCHWORM DRIVE	•				
1.	Confirm that test cable 46 is properly connected between the Electronics Module and the Function Test Panel.		<u></u>	(/)		
	Connect a DVM between the "Inchworm +5 VDC" test point and signal ground on the Function Test Panel.		V	(~)		
2.	All Inchworms Off/Mux Off.					
2.1	Execute commands:					
	- • •					
!		i				
	INCHWORM POWER OFF.	50		(~)		
} 	INCHWORM 1 DISABLE.	8A		(V)		
	INCHWORM 2 DISABLE.	8C		(~)		
	INCHWORM 3 DISABLE.	8E		(/)		
	INCHWORM EXTEND.	90	<u></u>	(/)		
	INCHWORM MOVEMENT INHIBIT.	94		(~)		
	INCHWORM CONTRACT.	92		(~)		
	(See Table 4.3 for a summary of Inchworm commands)					
2.2	Using the CRT, verify the following digital telemetry: Word F bit 6 = 0			(~)		
	Word D bit 7 = 0			(/		
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E. M.	MODULE UNIT TEST A 113	_ 1 1	16704			

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DATA SHEET NO. 2 OF 3 PARAGRAPH NO. 4.3

DETAILED FUNCTIONAL TESTS

		LOG A	HR OPE	7 200
PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(2.2)	Word E bit 0 = 0.		V	(~)
	Word I bit 3 = 0.			(-)
	bit 2 = 0.		V	(¹)
	bit 1 = 0.		<u>v</u>	(/)
	bit 0 = 0.			(ب)
	Word J bit 6 = 0.			(v)
	bit 7 = 0.	<1.5v		(V)
2.3	Verify that the DVM is measuring <1.0 volts.	<1.0	.48	volts
3.	+5 VDC Regulator Check			
3.1	Execute command: INCHWORM POWER ON.	4F		(V)
3.2	Verify via the CRT that digital			
	Word E bit 0 = 1.		<u></u>	(V)
3.3	Verify that the DVM is measuring $\pm 5.0 \pm 0.2$ VDC.	+5.0 ± 0.2	5.05	volts
3.4	Execute command: INCHWORM POWER OFF	50		(v)
3.5	Verify via the CRT that digital			
	Word E bit 0 = 0.			(1)
3.6	Verify that the DVM is measuring <1.0 volt	s <1.0	_48_	velts
3.7	Execute Command: INCHWORM MOVE	93	<u></u>	()
3.8	Verify via that digital Word J bit 6=1 Execute command: INCHWORM MOVEMENT INHIBI	r 94		()

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DATA SHEET NO. ____ OF _9_

PARAGRAPH NO. 4.3

DETAILED FUNCTIONAL TESTS

Ì		LOG A	HR OPE	3 <u>800</u>
PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
? 4. 4.1	Inchworm #1 Connect the four channels of a Tektronix 7633 oscilloscope with 7A26 plug-ins (or equivalent) to the 1 clamp A, 1 clamp B, 1 brake and 1 strerch test points on the Function Test Panel. Trigger on the brake			(V)
4.1.5	Alternatively, use an HP 1615A Logic Analyzer, connected to the Function Test Panel as follows:			
4.2	Connector pod 1/bit 0 to 1 Stretch bit 1 to 1 Brake bit 2 to 1 Clamp A bit 3 to 1 Clamp B bit 4 to 2 Stretch bit 5 to 2 Brake bit 6 to 2 Clamp A bit 7 to 2 Clamp B pod1/GND to Signal gnd TP (To set up for Inchworm 3 move pod 1/bits 0,1,2, and 3 to analogous Inchworm 3 positions). Set the Logic Analyzer for a) 8-bit mode, b) internal clock, and c) 100 ms. clocks. Trigger the Logic Analyzer approximately one second before the Inchworm Move Command is given. Extend	origina of Poo	PAGE IS R QUALITY	
	Execute commands: INCHWORM POWER ON.	4 F		
E	INCHWORM 1 ENABLE.	89	V	\(\sigma\)

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E.M. MODULE UN	NIT TEST A	11323	NUMBER	6704
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DATA SHEET NO. 4 OF 9

PARAGRAPH NO. 4.3

DETAILED FUNCTIONAL TESTS

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LOG AHR OPER SON PARA OR SPEC RECORD UNITS PROCEDURE STEP OR DATUM / SŤÈP COMMAND VERIFY NO. (V) 8 F INCHWORM EXTEND. V 93 (\checkmark) INCHWORM MOVE 94 INCHWORM MOVE INHIBIT (/) Using the CRT, verify the following 4.3 digital telemetry: (1) Word E bit 0 = 1 Word I bit 3 = 1 (V) (1) bit 2 = 0(1) bit 1 = 0bit 0 = 1 (1) (<) Word J bit 6 = 0 V (/) bit 7 - 0 4.4 Verify the scope pattern in Figure 4.3A, issuing hex command 93 (INCHWORM MO"L), then command 94 (INCHWORM MOVE INHIBIT). (1) 4.5 Contract Execute commands: INCHWORM POWER ON. (1) 4F 89 INCHWORM 1 ENABLE. (1) INCHWORM EXTEND. 90 (5 INCHWORM CONTRACT. 91 (V)

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DATA SHEET NO. _ 5 OF _ 9__

PARAGRAPH NO. 4.3

DETAILED FUNCTIONAL TESTS

	DETAILED FUNCTIONAL	LOG A	HR OPE	<u> 608</u> 5
PARA OR STEP NO.	PROCEDURE STEP		RECORD DATUM/	UNITS
	INCHWORM MOVE.	93		(/)
	INCHWORM MOVE INHIBIT.	94		(V)
4.6	Using the CRT, verify the following digital telemetry:			
	Word E bit 0 = 1			(~)
	Word I bit 3 = 1			()
	bit 2 = 0		<u></u>	(1)
	bit 1 = 0			(/)
	bit 0 = 0			(2)
1	Word J bit 6 = 0		<u> </u>	(/)
	bit 7 = 1.			(~)
4.7	Verify the scope pattern in Figure 4.3B, issuing hex commands 93 and 94 as needed.			(4
5.	Reset. Repeat 4.3.2.			(V)
6.	Inchworm #2			
6.1	Connect the four oscilloscope channels to the 2 clamp A, 2 clamp B, 2 brake, and 2 stretch test points on the Function Test			
	·			
	,			

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E. M.	MODULE	UNIT	TEST	SIZE	1132	17 NO. 23	NUMBER	16704
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DATA SHEET NO. 6 OF 9 PARAGRAPH NO. -3

DETAILED FUNCTIONAL TESTS

			LOG A	HR OPE	2 <u>/w</u>
PARA OR STEP NO.	PROCED	URE STEP		RECORD DATUM/	
(6.1)	Panel. Trigger on step 4.1.5) Extend.	the brake. (Or use			(1)
	Execute commands:	INCHWORM POWER ON.	4F		(4)
	,	INCHWORM 2 ENABLE.	83		(~)
		INCHWORM EXTEND.	8 F		()
	1	INCHWORM MOVE.	93		(1
	:	INCHWORM MOVE INHIBIT.	94		
6.3	Using the CRT, veri digital telemetry:	fy the following			
· ·	:	Word E bit 0 = 1			(5)
İ	,	Word I bit 3 = 0			()
*		bit 2 - 1			(V)
		bit 1 = 0			(~)
1		bit 0 = 1			(1/)
	,	Word J bit 6 = 0			(2)
		bit 7 = 0			(~)
6.4	Verify the scope par issuing hex command:	ttern in Figure 4.3A, s 93 and 94 as needed.			(~)
6.5	Contract.				
	Execute commands:				
		INCHWORM POWER ON.	45		(~)
	,	INCHWORM 2 ENABLE.	83		(~)

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E.M. MODULE UNIT TEST	SIZE CODE IDENT NO NUMBER 16704

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	DATA SHEET NO. 1 OF 4 PARAGRAPH NO. 4.3									
		DETAILED FU	NCTIC	NAL	TEST	S LOG A	HR OPE	R 500		
	PARA OR STEP NO.	PROCEDURE STE	P		SF	PEC PR	RECORD DATUM / VERIFY			
	(6.5)	INCHWORM EXT	END			90		(<i>~</i>)		
		INCHWORM CON	TRACT.	1		91		(V)		
		INCHWORM MOV	Ē	1) 3	-	(/)		
		INCHWORM MOV	E INHI	віт.		94	V	()		
	6.6	Using the CRT, verify the foll digital telemetry:	owing							
		Word E bit 0	- 1					(1)		
		Word I bit 3	= 0					()		
		bic 2				(V)				
		bit 1				~	(~)			
,		bit 0				~	(V)			
		Word J bit 6						(V)		
		•	= 1.					(N)		
	6.7	Verify the scope pattern in Fi issuing hex commands 93 and 94						()		
	7.	Reset. Repeat 4.3.2.						(V)		
	8.	Inchworm #3								
	8.1	Connect the four oscilloscope the 3 clamp A, 3 clamp B, 3 br 3 stretch test points on the F Test Panel. Trigger on the br see step 4.1.5)	nd n				(L)			
	8.2	Extend.								
							1,18~			
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	DATA SHEET NO. = OF 9 1	PARAGRAI'H	NO. <u>4.3</u>	
	DETAILED FUNCTIONAL	TECTO		
	DETAILLD TONCTIONAL		HR OPE	2 500
PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM/ VFRIFY	UNITS
(8.2)	Execute commaris:			
	INCHWORM POWER ON.	4F		(, ~)
	INCHWORM 3 ENABLE.	85		(~)
	INCHWORM EXTEND.	8 F		(1)
	INCHWORM MOVE	93		('\)
8.3	INCHWORM MOVE INHIBIT	94		
	Using the CRT, verify the following digital telemetry:			
	Word E bit 0 = 1			(U)
	Word I bit 3 = 0			(10)
	bit 2 = 0			()
	bit 1 = 1			in
	Sit 0 = 1			(~)
	Ford J bit 6 = 0			(4)
8.4	bit 7 = 0.			(レ)
8.5	Verify the scope pattern in Figure 4.3A, issuing hex commands 92 and 94 as needed.			(m)
	Contract			
	Execute commands:			
	INCHWORM POWER ON.	47	_ <u></u>	()
	INCHWORM 3 ENABLE.	3 D		()
	INCHWORM EXTEND.	. 30		()_
			Joy	
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PARAGRAPH NO. 4.3 DATA SHEET NO. + OF 9 DETAILED FUNCTIONAL TESTS LOG AHR OPER 100 PARA SPEC RECORD OR UNITS OR DATUM / PROCEDURE STEP STEP VERIFY COMMAND NO. **(/)** 91 INCHWORM CONTRACT. (8.5)(V) INCHWORM MOVE. 9.3 (1) INCHWORM MOVE INHIBIT. 94 Using the CRT verify the following digital 8.6 telemetry: (Word E bit 0 = 1 (1) Word I bit 3 = 0 (4) bit 2 = 0(4) bit 1 = 1(1 bit U = 0 (1) Word J bit 6 = 0 (1) bit 7 = 1. Verify the scope pattern in Figure 4.3B, 8.7 (4 issuing hex commands 93 and 94 as needed. Reset. Repeat 4.3.2. 3.8 (1) IST ENGINEER ____ / CVYZIA SIZE CODE IDENT NO 11323 16704 A E.M. MODULE UNIT TEST SCALE SHEET 5 3

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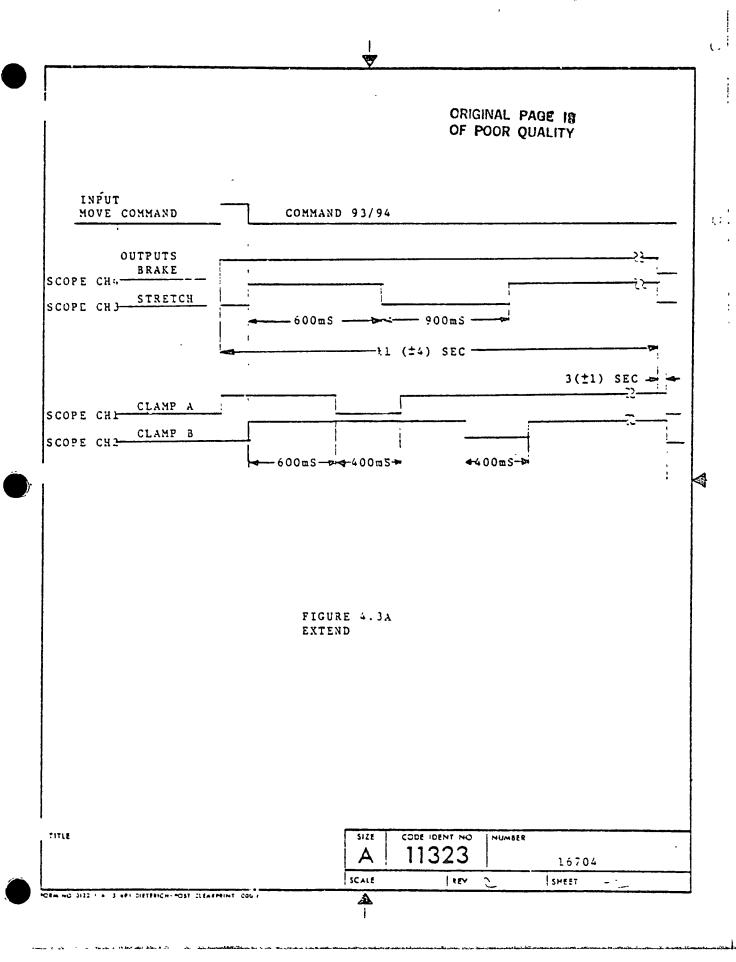
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Word/Bit	Function	On	Off
1/0	Inchworm Extend	8 F	90
1/1	IW3 Enable	8D .	8E
1/2	IW2 Enable	8B .	8C
I/3	IW1 Enable	89	8A
J/6	IW move	93	94
J/7	IW Contract	91	92
E/0	Power On'	4F	50

TABLE 4.3

SIZE	CODE IDENT NO.	NUMBI	P	
A	11323		16704	
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1 ORIGINAL PAGE 19 OF POOR QUALITY INPUT MOVE COMMAND COMMAND 93/94 OUTPUTS BRAKE SCOPE CHA-STRETCH SCOPE CHI - >000ms _____000ms __ 11(\$4) SEC 3(\$1) SEC 4 SCOPE CHI CLAMP A SCOPE CH2 CLAMP B : SmOU : SmOU : 40005 FIGURE 4.38 CONTRACT CORE IDENT NO TITLE 11323 Α 10704 = 1 -120 SHEET SCALE ئ who so hit is I so hitting with hiterania com-A

DATA SHEET NO. 1 OF 7 PARAGRAPH NO. 4.4

DETAILED FUNCTIONAL TESTS

		LOG A	HR OPER	2 800
PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM/	
(4.4)	Note: To Perform this test board A03-50927 must be installed. CALIBRATION LAMP DRIVER TEST			
1.	Confirm that test cable 44 is properly connected between the Electronics Module and the Function Test Panel.			(1
2.	Connect the Cal Lamp Housing containing the lamp and photodiode assembly to the Cal Lamp #1 [sensor] anode and cathode, and [lamp] "+" and "-" points on the Function Test Panel.			~ (~)
3.	Connect test cable 20 and 1ts breakout box to J20 on the Electronics Module.			
4.	Cal Lamp #1 On/Normal.			
4.1	Execute commands: CALIBRATION LAMP 2 OFF/OVERRIDE OFF CALIBRATION LAMP 1 OFF/ OVERRIDE OFF. CALIBRATION LAMP 3 OFF/OVERRIDE OFF CALIBRATION LAMP 1 ON. Verify that the lamp comes on.	17 16 18 10	\\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\	
4.2	<pre>Verify via the CRT that digital Word D bit 0 = 1 bit 1 = 0 bit 2 = 0 bit 3 = 0 bit 4 = 0 bit 5 = 0.</pre>	•	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	(r) (r) (r) (r) (r)
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DATA SHEET NO. ___ OF ___

PARAGRAPH NO. 4.4

DETAILED FUNCTIONAL TESTS

,		LOG A	HR OPE	R_800
PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
4.3		PAGE IS QUALITY		
	Channel 50 "Calibration Lamp 1 Current" is 3.1 ± 0.6V.	3.1 ± 0.6	3.100	volts
4.4	Using a DVM, observe then record test point J20-7 "Eamp #1 Radiance Error."	7.0 ± 1.5	6.2	volts
5.	Cal Lamp #1 On/Override.			,
5.1	Execute command:			
5.2	CALIBRATION LAMP 1 OVERRIDE ON. Verify via the CRT that digital	13		(-)
]	Word D bit 0 = 1			(1)
1	bit 1 = 0			(1)
1	bit 2 = 0			(V)
	bit 3 = 1			(~)
	bit 4 = 0			(4)
	bit 5 = 0.	<u> </u>		(-)
5.3	Verify that analog telemetry			
	Channel 50 is 3.1 ± 0.6V.	3.1 ± 0.6	3.200	volts
6.	Cal Lamp #1 Off/Override Off.			
6.1	Execute command:		<u>.</u>	
	CALIBRATION LAMP 1 OFF/OVERRIDE OFF.	16		(5)
		•		

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E.M. MODULE UNIT TEST	A	11323	NUMBER 16	704
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DATA SHEET NO. 3 OF 7 PARAGRAPH NO. 4.4

		LOG A	HR OPE	3/00
PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	
6.2	Verify via the CRT that digital			
	Word D bit 0 = 0			(V)
	bit 1 = 0			(1)
	bit 2 = 0			(V)
	bit 3 = 0			(V)
	bit 4 = 0			(1)
	bit 5 = 0.			(N)
6.3	Verify that analog telemetry			
	Channel 50 is zero volts.	0.0	0.000	volts
7.	Repeat 4.4.2, connecting the Cal Lamp Housing to the Cal Lamp #2 test points on the Function Test Panel.			(1)
8.	Cal Lamp #2 On/Normal.			
8.1	Execute commands:			
	CALIBRATION LAMP 2 OFF/OVERRIDE OFF.	17		(1)
	CALIBRATION LAMP 2 ON.	11		()
	Verify that the lamp comes on.			(1)
8.2	Verify via the CRT that digital			
	Word D bit 0 = 0			(~)
	bit 1 = 1			(~)
	bit 2 = 0			(1)
ł				

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DATA SHEET NO. 4 OF 7. PARAGRAPH NO. 4.4 DETAILED FUNCTIONAL TESTS LOG AHR OPER 600 PARA RECORD SPEC UNITS PROCEDURE STEP OR DATUM / STEP COMMAND VERIFY () V (8.2)bit 3 - 0 (*--*) bit 4 = 0 (4) bit 5 = 0. Verify that analog telemetry 3.3 Channel 51 "Calibration Lamp 2 Current" is 3.1 ± 0.6V. 3.1 ± 0.6 324 volts Using a DVM, observe, then record test point J2C-8 "Lamp #2 Radiance Error." 8.4 6.47 7.0 ± 1.5 volts Cal Lump /2 On/Override. 9. Execute command: 9.1 (m) 14 CALIBRATION LAMP 2 OVERRIDE ON Verify via the CRT that digital 9.2 (V) Word D bit 0 = 0 (r) bit 1 - 1 (1) bit 2 = 0 (/)bit 3 = 0 (V) bit 4 - 1 (V) bit 5 - 0. Verify that analog telemetry 9.3 3.1 ± 0.6 3.2b volts Channel 51 is 3.1 ± 0.6V. DATE 11 122 182 EST ENGINEER JEWIND QA SIZE CODE IDENT NO 16704 11323 E.M. MODULE UNIT TEST Α

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DATA SHEET NO. 5 OF 7 PARAGRAPH NO. 4.4

		LOG A	HR OPE	7 <u>800</u>
PARA OR STEP NO.	PROCEDURE STEP		RECORD DATUM/	UNITS
10.	Cal Lamp #2 Off/Override Off.			
10.1	Execute command:			
	CALIBRATION LAMP 2 OFF/OVERRIDE OFF	17		()
10.2	Verify via the CRT that digital			
1	Word D bit 0 = 0			(V)
	bit 1 = 0			(M
	bit 2 = 0			(V)
	 bit 3 = 0			(V)
	bit 4 = 0			(~)
	bit 5 = 0.		_8_	(1)
10.3	Verify that analog telemetry			
	Channel 51 is zero volts.	0.0	0.00	volts
11.	Repeat 4.4.2, connecting the Cal Lamp Housing to the Cal Lamp #3 test points on the Function Test Panel.			(4
12.	Cal Lamp #3 On/Normal.	,		
12.1	Execute commands:			
	CALIBRATION LAMP 3 OFF/OVERRIDE OFF.	18	v	(~)
	CALIBRATION LAMP 3 ON.	12	<u> </u>	(V)
	Verify that the lamp comes on.		-V	(~)

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E. M.	MODULE	UNIT	TEST	Size	11323	NUMBER2	5704	
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DATA SHEET NO. 6 OF 7 PARAGRAPH NO 4.4

	DATA SHEET NO. 6 OF 7 PARAGRAPH NO. 4.4										
1		DETAILED FUNCTIONAL	TESTS LOG A	HR OPE	<u> 800</u>						
	PARA OR STEP NO.	PROCEDURE STEP		RECORD DATUM /	i						
	12.2	Verify via the CRT that digital Word D bit 0 = 0			(1)						
		bit 1 = 0 bit 2 = 1 bit 3 = 0	,	\frac{1}{\sigma} \times \frac{1}{\sigma}	(~) (~)						
	12.3	bit 4 = 0 bit 5 = 0. Verify that analog telemetry		<u>v</u> <u>v</u>	(1)						
A		Channel 52 "Calibration Lamp 3 Current" is 3.1 ± 0.6V.	3.1 ± 0.6	3.32	volts						
	12.4	Using a DVM, observe, then record test point J20-9 "Lamp /3 Radiance Error."	7.0 ± 1.5	6.59	volts						
	13.1	Execute command:									
	13.2	CALIBRATION LAMP 3 OVERRIDE ON. Verify via the CRT that digital	15	<u></u>	()						
		Word D bit 0 = 0 bit 1 = 0 bit 2 = 1			() ()						
		bit 3 = 0 bit 4 = 0		<u> </u>	(V) (V)						

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DATA SHEET NO. 7 OF 7

PARAGRAPH NO. 4.4

DETAILED FUNCTIONAL TESTS

		LOG A	HR OPE	2 800
PARA OR STEP NO.	PROCEDURE STEP		RECORD DATUM / VERIFY	
(13.2)	bit 5 = 1.			(5)
13.3	Verify that analog telem:try			
	Channel 52 is 3.1 ± .6V.	3.1 ± 0.6	3.28	volts
14.	Cal Lamp #3 Off/Override Off.			
14.1	Execute command:			
	CALIBRATION LAMP 3 OFF/OVERRIDE OFF.	18		(1)
14.2	Verify via the CRT that digital			
	Word D bit 0 = 0			(V)
	bit 1 = 0			(~)
' >	bit 2 = 0			(~)
	bit 3 = 0		<u></u>	(v)
	bit 4 = 0		<u></u>	(V)
	b1t 5 = 0.			(1)
14.3	Verify that analog telemetry		į	
	Channel 52 is zero volts.	0.0	200	volts

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E.M. MODULE UNIT TEST	4 1 1	11323 NUME	16704	
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DATA SHEET NO. _1 OF_4 PARAGRAPH NO. 4.5 DETAILED FUNCTIONAL TESTS LOG AHR OPER 850 PARA OR RECORD SPEC UNITS PROCEDURE STEP DATUM / I OR STEP COMMAND VERIFY NO. Note: To Perform This Test Board A04-50942 must be installed.
BLACKBODY CONTROL TEST (4.5)Confirm that test cable 45 is connected 1. properly between the Electronics Module (J)and the Function Test Panel. Connect test cable 20 and its breakout (V) box to J20 on the Electronics Module. 2. To simulate the blackbody sensor, connect Decade Resistor #1 to the Blackbody Heater Input TP's on the Function Test Panel. Set DR #1 at 30000 ohms ("cold") (V) to start. 3. Backup On. 3.1 Execute commands: BLACKBODY HEATER CONTROL OFF/ (V) BACKUP OFF. 24 BLACKBODY HEATER CONTROL ON/ T1 SELECT 20 BLACKBODY BACKUP ON. 23 3.2 Verify via the CRT that digital Word E bit 2 = 1(1) bit 3 = 0 $\langle \checkmark \rangle$ bit 4 = 0(1) bit 5 = 1. LEST ENGINEER QA 5128 16704 11323 E.M. MODULE UNIT TEST A SCALE SHEET :

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	DATA SHEET NO2 OF _4 I	PARAGRAPH	NO. <u>4.5</u>	_
1	DETAILED FUNCTIONAL			- (->
		LOG A	HR OPE	<u>R_XN</u>
PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	
3.3	Verify via the CRT that analog telemetry			
	Channel 53 "Blackbody Current" is .5 <v<1.5 td="" volts.<=""><td>.5<u><</u>V<u><</u>1.5</td><td>1.14</td><td>volts</td></v<1.5>	.5 <u><</u> V <u><</u> 1.5	1.14	volts
3.4	Using a DVM verify that test point J20-12 is in the range $-12 < V < 0$ volts.	-12 <v <0<="" td=""><td>-3.4</td><td>volts</td></v>	-3.4	volts
	Using a DVM verify that test point J20-11 is in the range .5 < V < 1 volt.	.5 <v <1<="" td=""><td>77_</td><td>volts</td></v>	77_	volts
4.	Normal T1 On.			
4.1	Execute commands:	-		
	BLACKBODY HEATER CONTROL OFF/ BACKUP OFF.	24		c 🗸
7	BLACKBODY HEATER CONTROL ON/ T1 SELECT.	20		(س)
4.2	Verify via the CRT that digital			
	Word E bit 2 = 1			(~)
	bit 3 = 0			(7)
	bit 4 = 0			()
	bit 5 = 0.			(1)
5.	Normal T2 On.			
5.1	Execute commands:			
	BLACKBODY HEATER CONTROL OFF/ BACKUP OFF.	24		(V)
	BLACKBODY HEATER CONTROL ON/ T1 SELECT.	. 20		(J)
				-
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E.M.	MODULE UNIT TEST A 113		16704	
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DATA SHEET NO. 3 OF 4 PARAGRAPH NO. 4.5

L			LOG A	HR OPE	7 200
F 99	PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
	(5.1)	BLACKHODY T2 SELECT.	21		(/)
	5.2	Verify via the CRT that digital Word E bit 2 = 1 CRIGINAL	PAGE IS		(v')
		bit 3 = 1 OF POOR bit 4 = 0	QUALITY	<u> </u>	(J) (J)
	6.	bit 5 = 0.		<u></u>	(J)
	6.1	Execute commands:			
		BLACKBODY HEATER CONTROL OFF/BACKUP OFF.	24	<u>~</u>	(٦)
		BLACKBORY HEATER CONTROL ON/ T1 SELECT.	20		(V)
		BLACKBODY T3 SELECT.	22		(√)
	6.2	Verify via the CRT that digital Word E bit 2 = 1			(<i>V</i>)
		bit 3 = 0			(V)
		bit 4 = 1			(V)
		bit 5 = 0.			(/)
	7.	Thermistor Test.			
	7.1	Set DR #1 at 05000 ohms ("hot").		2.00	(V)
		Verify via the CRT that analog telemetry Channel 53 is ≤1.0V.	≤1.0	0,0	volts

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E.M. MODULE UNIT TEST	SIZE A	11323	16704
	SCALE	SEV C	SHEET

		DATA SHEET NO OF _ 1	PARAGRAPH	NO. <u>4.5</u>	-				
1		DETAILED FUNCTIONAL		HR OPER	2 780				
	PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS				
	7.2	Using a DVM verify that test point $J20-12$ is in the range $0 < V < 12$ volts.	0 < V < 12	1.31	volts				
		Using a DVM verify that test point J20-11 is in the range5 <v<.5< td=""><td>5<v<.5< td=""><td>0.0</td><td>volts</td></v<.5<></td></v<.5<>	5 <v<.5< td=""><td>0.0</td><td>volts</td></v<.5<>	0.0	volts				
	7.3	Change DR #1 to 30000 ohms ("cold").			(7)				
		Venify via the CRT that analog telemetry		27	_				
	5	Channel 53 is ≥2.5 volts.	≥2.5	3.7	volts				
	8.1	8. Re-et Relavs. 8.1 Execute command:							
	0.1	BLACKBODY HEATER CONTROL OFF,/ BACKUP OFF.	24	<u></u>	(J)				
Á	8.2	Verify via the CRT that digital							
		Word E bit 2 = 0			(/)				
		bit 5 = 0.			(/)				
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	E. M.	MODULE UNIT TEST A 113	<u> </u>	16704					
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DATA SHEET NO. _ OF _ 5

PARAGRAPH NO. 4.6

		LOG A	<u>HR OPEI</u>	R KID
PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
1.	Note: To Perform This Test Board A04(50942) Must Be Installed. CFPA TESTING Confirm that test cable 40 is properly connected between the Electronics Module and the Function Test Panel. Connect test cable 20 and its breakout box to J20 on the Electronics Module. Connect DVM's set to their 20V scales to	-	<u> </u>	(\strain_s)
2.	points J20-13 and J20-14 on the breakout box. To simulate the control diode connect			(v)
	Decade Resistor #1 across the CFPA Heater Control TP's on the Function Test Panel. Set DR #1 at 18000 ohms ("hot").		<u></u>	(V)
	To simulate the monitor diode connect Decade Resistor #2 across the CFPA Monitor TP's on the Function Test Panel. Set DR #2 at 18000 ohms ("hot").			(√)
3.1	CFPA Heater Monitor and Controller Off Execute commands:			
	CFFA HEATER CONTROL ON/T1 SELECT/ CFPA TELEMETRY ON.	19	<u></u>	([/])
	CFPA TELEMETRY OFF.	1C 1D	<u> </u>	(v/)
3.2	Verify via the CRT that digital			
	Word H bit 4 = 0			([/])
	bit 5 = 0			(1)
		•		

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M.	MODULE	UNIT	TEST	A	11323	NUMBER	16704	
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PARAGRAPH NO. 4.6

DETAILED FUNCTIONAL	TESTS	•
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		LOG A	HR OPER	3 800
PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	
(3.2)	b1t 6 = 0			(√)
	bit 7 = 0.			(√)
3.3	Verify via the CRT that analog telemetry			
	Channel 68 "CFPA Heater Current" is \$1.0V.	≤1.0°	0.0	volts
	Channel 70 "CFPA Monitor Temperature" is ≤1.0V.	≤1.0	0.0	volts
	Channel 67 "CFPA Control Temperature" is \$1.0V.	≤1.0	0.0	volts
3.4	Verify that the DVM monitoring J20-13 "Control Diode Output Test" is measuring in the range 0 ≤ V < .1 volts.	0 <u><</u> ∇ <.1	0.0	volts
3.5	Verify that the DVM monitoring J20-14 "CFPA Temp Error Test" is measuring in the range $0 \le V < .1$ volts.	0 <u><</u> V <.1	0.0	volts
4.	CFPA Heater Controller Off			
4.1	Execute commands:			
	CFPA HEATER CONTROL ON/T1 SELECT/ CFPA TELEMETRY ON.	19	<u> </u>	(J)
	CFPA HEATER CONTROL OFF.	10		(1)
4.2	Verify via the CRT that digital			
	Word H bit 4 = 0			(4)
	bit 5 = 0			(~)
	bit 6 = 0			(V)
	bit 7 = 1.			(1)

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DATA SHEET NO. _3 OF _5 PARAGRAPH NO. _ . 4.6

		LOG A	HR OPER	5 NOO
PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
4.3	Verify via the CRT that analog telemetry	≤1.0	0.08	volts
5.1	Execute commands: CFPA HEATER CONTROL ON/T1 SELECT/ CFPA TELEMETRY ON. CFPA HEATER CONTROL OFF.	19 1D	<u> </u>	(√) (√)
	CFPA T2 SELECT.	1A		(7)
5.2	Ve-ify via the CRT that digital Word H bit 4 = 0 bit 5 = 1 bit 6 = 0 bit 7 = 1.		7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	(√) (√) (√)
5.3	Verify via the CRT that analog telemetry Channel 68 is ≤1.0V.	≤1.0	٥٥٠_	volts
6.1	Heater Controller Off/I3 On Execute commands:			
	CFPA HEATER CONTROL ON/T1 SELECT/ CFPA TELEMETRY ON. CFPA HEATER CONTROL OFF.	19 1D	<u> </u>	(√) (√)
	CFPA T3 SELECT.	. 13		(0)

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PARAGRAPH NO. 4.6

		LOG A	HR OPEF	2 800
PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
6.2	Verify via the CRT that digital			,
	Word H bit 4 = 0			(√)
	bit 5 = 0			(√)
	bit 6 = 1			(v/.).
	bit 7 = 1.			(√)
6.3	Verify via the CRT that analog telemetry		_	
	Channel 68 is ≤1.0V.	≤1.0		volts
7.	Heater Cont aller On/Tl On			
7.1	Execute Command:			
	CFPA HEATER CONTROL ON/T1 SELECT/ CFPA TELEMETRY ON.	19		(2)
7.2	Verify via the CRT that digital			
	Word H bit 4 = 1		<u></u>	(V)
	bit 5 = 0			(1)
	bit 6 = 0			(²)
	bit 7 = 1.			(V)
8.	Test Control Diode	•		
8.1	With DR #1 set at 18000 ohms verify via the CRT that analog telemetry			
	Channel 67 is ≤1.0V.	≤1.0	0.0	volts
	Channel 68 is ≤1.0V.	£1.0	0.0	volts
		<u></u>		L

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E. M.	MODULE	UNIT	TEST	Size A	11323	NUMBER	16704	,
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PARAGRAPH NO. 4.6

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	DETAILED FUNCTIONAL	LOG A	HR OPER	1 <u>800</u>
PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	
(8.1)	Verify that $J20-13$ is in the range $.5 < V < 1.5$ volts.	.5 < V <1.5	1.0	volts
	Verify that $J20-14$ is in the range $0 < V < 15$ volts.	0 < V <15	<u> 2.57</u>	volts
8.2	Reset DR #1 to 19000 ohms. Record the level of analog telemetry channel 67	-	1.7	volts
	channel 68		0.0	volts
8.3	Reset DR #1 to 20000 ohms ("cold").			
Į	Verify that analog telemetry			
	Channel 67 is ≥2.5 volts	≥2.5	4.8	volts
	Channel 68 is 22.5 volts	22.5	4.8	volts
8.4	Verify that $J20-13$ is in the range $.5 < V < 1.5$ volts.	.5 <v <1.5<="" td=""><td>1.1</td><td>volts</td></v>	1.1	volts
	Verify that $J20-14$ is in the range $-15 < V < 0$ volts.	-15 <v 0<="" <="" td=""><td>5</td><td>volts</td></v>	5	volts
9.	Yest Monitor Diode			
9.1	With DR #2 set at 18000 ohms verify that analog telemetry channel 70 is ≤1.0 volts.	≤1.0	2.0	volts
9.2	Reset DR #2 to 19000 ohms and observe the level of analog telemetry channel 70.		1.7	volts
9.3	Reset DR ± 2 to 20000 ohms ("cold"), and verify that analog telemetry channel 70 is $\geq 2.5 \text{V}$.	<u>≥</u> 2.5	5.1	volts volts
10.	Reset. Repeat 4.6.3.			(🗸)
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		DATA SHEET NO. 1 OF 5	PARAGRAPH	NO. <u>4.7</u>	_
		DETAILED FUNCTIONAL	TESTS LOG A	HR OPEI	7 800
	PARA OR STEP NO.	PROCEDURE STEP		RECORD DATUM/	
	(4.7)	Note: To Perform This Test Boards A04 (50942) & A16(50912) must be installed. COLD STAGE OUTGAS HEATER CONTROL			
	1.	Confirm that test cable 40 is connected properly between the Electronics Module and the Function Test Panel.		~	()
		Connect Decade Resistor #1 across the Cold Stage Heater Input TP's to simulate the Cold Stage Platinum Resistance Thermometer. Set DR #1 at 00160 ohms ("<100°K").		~	5
		Attach test cable 20 and its breakout box to J20 on the Electronics Module.		V	(1)
	2.	Heater Disabled/Controller and Temp Monitor Off.			
ገ	2.1	Execute commands:			
		COLD STAGE HEATER CONTROLLER ON/TELEMETRY ON.	58		(V)
		COLD STAGE HEATER CONTROLLER OFF/COLD STAGE OUTGAS HEATER DISABLED.	59		(~)
1		COLD STAGE TELEMETRY OFF.	51		(v)
	2.2	Verify via the CRT that digital			
		Word B bit 7 = 0			(~)
		Word H bit 0 = 0			(~)
		bit 1 = 0.			(-)
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PARAGRAPH NO. 4.7

DETAILED FUNCTIONAL TESTS

	DETAILED FONCTIONAL		HR OPER	3 Yro
PARA OR STEP NO.	PROCEDURE STEP		RECORD DATUM/	UNITS
2.3	Verify via the CRT that analog telemetry			
	Channel 55 "Cold Stage Heater Current" is ≤1.0VDC.	≤1.0	0.0	volts
	Channel 64 "Cold Stage Temperature B (hot)" is ≤1.0VDC.	≤1.0	0.0	volts
	Channel 63 "Cold Stage Temperature A (cold)" is ≤1.0 VDC.	≤1.0	0.0	volts
2.4	Using a DVM, verify that test point			
	J20-15"outgas Control Test" is in the range $V < 1$.	V < 1.	<u> </u>	volts
	J20-16 "Cold Stage Temp Error Test" is in the range V $<$ 1.	v < 1.	0.0	volts
	J20-18 "Heater Current Test" is in the range $v < 1$.	V < 1.	0.0	volts
3.	Heater Disabled/Controller Off/Temp Monitor On.			
3.1	Execute commands:			
	COLD STAGE HEATER CONTROLLER ON/TELEMETRY ON.	58		(4
	COLD STAGE HEATER CONTROLLER OFF/COLD STAGE OUTGAS HEATER DISABLED.	59	<u></u>	(4

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E. M.	MODULE	UNIT	TEST	A	1132		NUMBER	16704	
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	DATA SHEET NO. 3 OF 5	F	ARA	GRAPH	NO. <u>4.7</u>	_	
	DETAILED FUNCTION	IAL	TES	TS LOG A	HR OPE	R 800	
PARA OR STEP NO.	PROCEDURE STEP				RECORD DATUM/		
3.2	Verify via the CRT that digital						
	Word B bit 7 = 1	ł				(1)	
	Word H bit O = O					(1)	
	bit 1 = 0.					(V)	
3.3	Verify via the CRT that analog telemet	try					
	Channel 55 is ≤1.0 V.			≤1.0	<u>0.0</u>	volts	
3.4	Using a DVM, verify that test point						
	J20-15 is in the range $V < 1V$.			v < 1.	0.0	volts	
	J20-16 is in the range V < V .			v < 1.	0.1	volts	
7	J20-18 is in the range $V < 1V$.			v < 1.	0.0	volts	
4.	Heater Disabled/Controller and Temp Monitor On.					٠	
4.1	Execute command:						
	COLD STAGE HEATER CONTROLLER ON/ TELEMETRY ON.			58		5	
4.2	Verify via the CRT that digital				•		
	Word B bit 7 = 1					(-)	
	Word H bit 0 = 1					(')	
	bit 1 = 0.					(<i>i</i> -)	
, EST	EST ENGINEER DATE & DATE & DATE QA						
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PARA OR STEP NO.	PROCEDURE STEP		RECORD DATUM / VERIFY	
4.3	Using a DVM, verify that test point			
*	J20-15 is in the range V < 1V.	V < 1	.43	volts
•	J20-16 is in the range $-15 < V < 0V$.	-15 < V < 0	88	volts
	J20-17 is in the range .1 < V < 1.QV	.1 < V < 1.3	-01. A	volts
	J20-18 is in the range $V < .1V$.	v < .1	-01	volts
4.4	Display and note the values of analog telemetry Channel 55		0.0	volts
	Channel 63		5.1	volts
I'	Channel 64.		4.7	volts
4.5	Change DR #1 from its minimum value of 00160 ohms to 00400 ohms ("125°K").			(1)
	Verify that analog telemetry			
	Channel 55 approaches zero volts.		0.0 0	(~)
	Channel 63 changes from ≥ 2.5V to ≤1.0V.		<u>ao /</u>	()
	Channel 64 decreases from its initial value by 1.0 \pm 0.5V.		3.6 /	(~)
5.	Heater Enabled/Controller and Temp Monitor On.			
5.1	Execute commands:			
	COLD STAGE HEATER CONTROLLER ON/TELEMETRY ON.	58		(~)
	COLD STAGE OUTGAS HEATER ENABLE.	. 57		(~)

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E.M.	MODULE UNIT	TEST	A	11323	NUMBER	16704	
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DATA	SHEET	NO5_	OF_5_	PARAGRAPH	NO. 4.
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DETAILED FUNCTIONAL TESTS

		LOG A	HR OPE	RXUU
PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
5.2	Verify via the CRT that digital			
	Word B bit 7 = 1			(v)
	Word H bit 0 = 1			(5)
	bit 1 = 1.			(5)
5.3	Display and note the values of analog telemetry			·
	Channel 55		2_	volts
	Channel 64.	,	3.6	volts
5.4	Change DR #1 from 00400 ohms to 01200 ohms ("hot").			(~)
1	Verify that analog telemetry			
	Channel 55 approaches zero volts.		0.0	(-)
	Channel 64 approaches zero volts.		0.0 V	(-)
5.5	Using a DVM, verify that test point			
	J20-15 is \leq .5.volts.	<u><</u> .5	.42	volts
	J20-16 is in the range ≥ 0	<u>></u> 0	4.0	volts
	J20-17 is in the range V >15V	V>15V	7770.	volts
	J20-18 is in the range $0 \le V < .5$	0≤∇ ❖.5	0.0	volts
6.	Reset. Repeat step 4.7.2.			(:-)
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E. M. MODULE UNIT TEST

| SIZE | CODE IDENT NO | NUMBER | 16704 |
| SCALE | REV 3 | SHEET 1

DATA SHEET NO. ___ OF __ PARAGRAPH NO. _4.8____

DETAILED FUNCTIONAL TESTS

	LOG AHR OPER				
PARA OR STEP NO.	PROCEDURE STEP	OR COMMAND	RECORD DATUM / VERIFY	UNITS	
(4.5)	NOTE: In Order To Perform This Test Boards A05(50920) & A08(51402) Must Be Installed.				
	DC RESTORE/CAL SHUTTER SENSORS				
1.	Confirm that test cables 45, 46 and P13 are connected properly between the Electronics Module and the Function Test Panel Connect a DVM set on its 20V scale between the DC Restore TP and signal ground. If		<u></u>	د ک	
	the Mux is already connected to the har- ness, then use a breakout box and monitor connector P13, PINS M1 and M2.			(√)	
2.	To simulate the Main Shutter Sensor, connect Decade Resistor #1 across TP's 1 and 7 on the FTP.			√ ,	
	To simulate the Backup Shutter Sensor connect Decade Resistor #2 across TP's 2 and 8 on the FTP.			W	
3.	DC Restore Off				
3.1	Execute commands: SHUTTERS OFF. DC RESTORE OFF/TELEMETRY SCALING OFF.	F 6	<u>v</u>	() (⁄)	
3.2	Verify via the CRT that digital Word L bit 0=0.		<u></u>	(V)	
3.3	Verify via the CRT that analog telemetry				
	Channel 61 "Calibration Shutter Temperature" is zero.	<0_1	.04	volts	
	Channel 62 "Backup Shutter Temperature" is zero	< 0:_ 1	.04	volts	
3.4	Verify that the DVM is measuring zero voltage.	. <0-1	0.00	volts	
	<u> </u>	L	<u> </u>	!	

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E.M. MODULE UNIT TEST	Size	11323	NUMBER	16704
	SCALE	₹EV	ン	SHEET -

DATA SHEET NO. 2 OF 3

PARAGRAPH NO. 4.8

	DETAILED TOTAL	LOG A	HR OPE	<u> </u>
PARA OR STEP NO.	PROCEDURE STEP		RECORD DATUM / VERIFY	
4.	DC Restore On/Normal Mode Select			
4.1	Set DR #1 at 05000 ohms("hot").			(√)
	Set Dr #2 at 30000 ohms ("cold").			(√)
4.2	Execute commands:			_
ĺ	DC RESTORE ON.	3 E		()
	CALIBRATION SHUTTER ON/BACKUP SHUTTER OFF/DC RESTORE NORMAL SELECT.	۵	v	(V).
4.3	Verify via the CRT that digital Word L bit 0=1.			(J)
4.4	Verify via the CRT that analog telemetry			ĺ
7	Channel 61 is ≤1.0V. Channel 62 is ≥2.5V.	≤1.0 ≥2.5	4.60	volts volts
4.5	Verify that the DVM is measuring \$1.0V.	≤1.0	.50	volts
4.6	Set DR #1 to 30000 ohms ("cold").	21.0		(√)
4.0				(√)
	Set DR #2 to 05000 ohms ("hot").			
4.7	Verify via the CRT that analog telemetry		1.15	
	Channel 61 is ≥2.5V. Channel 62 is ≤1.0V.	≥2.5 ≤1.0	4.60	volts volts
				VOICS
4.8	Verify that the DVM is measuring 21.8 volts.	≥1.45 ≥1.8	1.59	volts
5.	DC Restore On/Backup Mode Select	Ste E J. 3787A		
5.1	Set DR #1 at 05000 ohms			(√)
	Set DR #2 at 30000 ohms.	İ		(1)

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E.M. MODULE UNIT TEST	SIZE	11323	16704
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DATA SHEET NO. 3 OF 3

PARAGRAPH NO. 4.8

		LOG A	HR OPE	B XOO
PARA OR STEP NO.	PROCEDURE STEP	T	RECORD DATUM/	
5.2	Execute commands:			
	DC RESTORE OFF/TELEMETRY SCALING OFF.	6		(√)
	DC RESTORE ON.	3 E	<u></u>	(1)
	BACKUP SHUTTER ON/CALIBRATION SHUTTER OFF/DC RESTORE BACKUP SELECT.	E		(/)
5.3	Verify via the CRT that digital Word L bit 0=0.			(V)
5.4	Verify via the CRT that analog telemetry			
	Channel 61 is ≤1.0V.	≤1.0	9.00	volts
*	Channel 62 1s ≥2.5V.	22.5	4060	volts
5.5	Verify that the 'VM is measuring ≥ 1.8 V.	21.8	_1.59	voits
5.6	Set DR #1 to 30000 ohms.	रहर हो उपराA		(1)
	Set DR #2 to 05000 ohms.			(1/)
5.7	Verify via the CRT that analog telemetry			
	Channel 61 is ≥2.5V.	22.5	4.60	velts
	Channel 62 is ≤1.07.	≤1.0	0.00	volts
5.8	Verify that the DVM is measuring ≤1.0 volt	\$. ≤1.0	49	1ts
6.	Reset. Repeat 4.8.3.			(~)
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E.M. MODULE UNIT TEST	Size A	11323	16704
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PARAGRAPH NO. 4.9

		LOG A	HR OPE	700
PARA CR STEP NO.	PROCEDURE STEP	SPEC	RECORD DATUM/	
(4.9)	Note: In Order To Perform This Test Boards A05(50920) & A16(50912) Must Be Installed. SMA +/- HEATER CONTROL			
	Verify that test cable 28 is properly connected between the Electronics Module and the Function Test Panel. Connect test cable 20 and its breakout box to the Electronics Module.		<u></u>	(1) (1)
2.0	To simulate the heater thermistors connect Becade Resistor #1 across the SMA +Z heater input TP's and connect Decade Resistor #2 across the SMA -Z heater input TP's. Set both DR #1 and DR #2 at 08000 ohms ("hot").			છ
3.0	To monitor heater current connect a DVM across the SMA +Z heater output TP's, observing the proper polarities. Connect another DVM across the SMA -Z heater output TP's. For DVM J20 test access connector meter readings use A5(30920) test point 1 (S/C 28 VRTN) during Para 4.9 as meter return. Set the DVM's on the 0-2VDC scale (1V on the DVM=1 A current in the circuit under test.)			જ
4.0	BOTH HEATERS OFF ENECUTE COMBANDS: SMA +Z HEATER CONTROLLER OFF. OFF.	4.2	\frac{1}{\sqrt{1}}	(N
4.2	Verify via the CRT that digital Word A bit 2=0 bit 3=0 Word L bit 3=0 bit 4=0.		333	\$\$\$\$
4.3 5.0	Verify that each DVM is measuring ± 10 mV. SMA +Z Heater On/-Z Heater Off.	£ 10	V1.2mV	nvoits

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PARAGRAPH NO. 4.9

DETAILED FUNCTIONAL TESTS

ļ	DETAILLE TONCTIONAL	LOG A	HR OPE	2 800
PARA OR STEP NO.	PROCEDURE STEP		RECORD DATUM / VERIFY	
5.1	Execute commands: SMA +Z HEATER CONTROLLER ON. SMA -Z HEATER CONTROLLER OFF.	41 44	<u> </u>	(v') (v')
5.2	Verify via the CRT that aigital Word A bit 2=1 bit 3=0 Word L bit 3=1 bit 4=0.		- 	3333
5.3	Verify that both the $\pm Z$ and $\pm Z$ DVM'S are measuring ≤ 10 mV.	<u>≤</u> 10	1.1mV (3+)	mvolts
5.4	Change DR #1 from 08000 to 12000 chms ("cold"). Verify that the +2 DVM measures \geq 500 mV, and the -2 DVM measures \leq 10 mV	≥500 <10	1226 de	עליט שעסlta mvolta
5.5	Using a DVM, verify that test point J20-19 "+Z Collector Voltage Test" is in the range .14V< 1V.	. 1< V<1	-135	volts
6.0	Using a DVM, verify that test point J20-20 "+2 Heater On/Off Test" is specified ≥ 1.8 volts SMA +2 HEATER OFF/-Z HEATER ON.	≥1.8	2.23	volts
6.1	Execute commands: SMA +Z HEATER CONTROLLER OFF. SMA -Z HEATER	42		(V)
	CONTROLLER ON.	43		(v)
6.2	Verify via the CRT that digital Word A bit 2=0 bit 3=1 Word L bit 3=0 bit 4=1.			3333
6.3	Verify that both the $\pm Z$ and $\pm Z$ DVM'S are measuring ≤ 10 mV.	≤ 10	0.0 mV	mvolts
6.4	Change DR /2 from 08000 to 12000 ohms ("cold").			(4)

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DATA SHEET NO. 3 OF 3

PARAGRAPH NO. 4.9

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<u></u>		LOG A	HR OPE	R 800
PARA OR STEP NO.	PROCEDURE STEP		RECORD DATUM / VERIFY	!
(6.4)	Verify -Z DVM measures ≥ 500mV +Z DVM measures ≤ 10mV		259X d	3
6.5	Using a DVM, verify that test point J20- 21 is in the range .1 <v<1.< td=""><td>0.1 < V<1</td><td>130</td><td>volts</td></v<1.<>	0.1 < V<1	130	volts
	Verify that test point J20-20 is less than 1 volt.	د 1	.025	volt
7.0	Reset. Repeat 4.9.4.			volts
	Reset. Repeat 4.5.4.			(,
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E.M.	MODULE	UNIT	TEST	SIZE	11323	NUMBER	16704
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DATA SHEET NO. 1 OF 1

PARAGRAPH NO. 4.10

DETAILED. FUNCTIONAL TESTS

	DETAILED FUNCTIONAL	LOG A	HR OPE	2800
PARA OR STEP NO.	PROCEDURE STEP		RECORD DATUM/	UNITS
(4.10)	Note: In Order To Perform This Test Boards A05(50920) & A16(50912) Must Be Installed. INTERMEDIATE STAGE OUTGAS HEATER CONTROL			
1.	Confirm that test cable 40 is properly connected between the Electronics Module and the Function Test Panel.			(√)
1.1	To simulate the Intermediate Stage PRT connect Decade Resistor #1 across the Intermediate Stage Heater Input TP's on the test panel. Set DR #1 at a minimum "temperature" of 00400 ohms.			W
1.2	To monitor heater current connect a DVM across the Intermediate Stage Heater Current TP's, observing the proper polarities. One volt on the DVM equals 1 amp of current in the circuit under test.			(/)
1.3	Connect test cable 20 and its breakout box to J20 on the Electronics Module.			(√)
2.	Intermediate Stage Heater Controller Off/ Heater Disabled.			
2.1	Execute command:			
	COOLER INTERMEDIATE STAGE HEATER CONTROLLER OFF/HEATER DISABLED.	47		(v')
2.2	Verify via the CRT that digital			
	Word H bit 2 = 0			(V)
	bir 3 = 0			(1)
2.3	Verify via the CRT that analog telemetry			
	Channel 65 "Intermediate Stage Temperature A (cold)" is ≤1.0V.	· ≤1.0	0.00	volts

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E.M. MODULE UNIT TEST	A	11323	16704	
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DATA SHEET NO. 2 OF 3

PARAGRAPH NO. 4.10

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PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS	
(2.3)	Channel 66 "Intermediate Stage Temperature B (hot)" is ≤1.0V.	≤1.0	0.0	volts	
2.4	Verify that the current monitoring DVM is measuring \$10 mV.	≤10	0.0	mvolts	
3.	Intermediate Stage Reater Controller On/ Heater Disabled.	-			
3.1	Execute command:				
	COOLER INTERMEDIATE STAGE HEATER CONTROLLER ON.	46		(√,	
3.2	Verify via the CRT that oigital				
	Word H bit 2 = 1			(/)	
j j	bit 3 = 0.			(1)	
3.3	Verify that the DVM is measuring ≤ 10 mV.	≤10		mvolts	
3.4	Display analog telemetry channels 65 and 66 on the CRT. With DR #1 set at 00400 ohms record the values of				
	Channel 65	(>2.5)	4.82	volts	
	Channel 66.	(>2.5)	4.24	volts	
	Both channels should be greater than 2.5V.				
3.5	Change DR #1 to 00600 ohms ("170 $^\circ$ K"). Verify that Channel 65 goes to $^{\leq}$ 1 0V.	≤1.0	0.0	volts	
	Record the value of Channel 66.		3.120	volts	
3.6	Change DR #1 to 01200.			(√)	
	Verify that Channel 66 goes to ≤1.0V.	≤1.0	601	volts	
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	MODULE			Size A	11323	NUMBER	16704	
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PARAGRAPH NO. 4.10

DETAILED FUNCTIONAL TESTS

LOG AHR OPER							
PARA OR STEP NO.	PROCEDURE STEP		RECORD DATUM/				
(3.6)	Verify that Channel 65 remains ≤1.0V.	≤1.0	0.00	volts			
3.7	Reset DR #1 to 00400 ohms		<u> </u>	(v)			
4.	Intermediate Stage Heater Controller On/ Heater Enabled.						
4.1	Execute commands:						
	COOLER INTERMEDIATE STAGE HEATER CONTROLLER ON.	46		(4)			
	COOLER INTERMEDIATE STAGE OUTGAS HEATER ENABLED.	45	<u></u>	(J)			
4.2	Verify via the CRT that digital						
	Word H bit 2 = 1			(1)			
	bit 3 - 1.			(1)			
4.3	With DR #1 set at 00400 ohms, verify that the current monitoring DVM is measuring 2300 mV.	≥300	439	mvolts			
	Using a DVM verify that test point $J20-22$ "Intermediate Outgas On/Off Test" is in the range $.1 < V < 1.0$ volts.	.1 < V < 1.0	058.	volts			
	Using a DVM verify that J20-60 "outgas Control Test" is 23.0 volts.	≥3.0	4.39	volts			
4.4	Set DR #1 at 01200 ohms. Verify that the current monitoring DVM is measuring \leq 10mV.	≤10	0.0	mvolts			
	Verify that J20-22 is in the range 1 <v<95 td="" v<=""><td>1 <v 5<="" td="" 🛮=""><td>4.5</td><td>volts</td></v></td></v<95>	1 <v 5<="" td="" 🛮=""><td>4.5</td><td>volts</td></v>	4.5	volts			
	Verify that J20-60 is ≤1.0 volts.	≤1.0	2	volts			
5.	Reset. Repeat 4.10.2.	•		(v)			

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D . M.	MODULE	UNIT	TEST	A	11323	NUMBER	16704	
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DATA SHEET NO. 1 OF 4 PARAGRAPH NO. 4.13 LOG AHR OFER SOU DETAILED FUNCTIONAL TESTS PARA SPEC RECORD OR PROCEDURE STE? DATUM/ UNITS STEP OR VERIFY COMMAND : NO. (4.13) Note: In Order To Perform 's Test Boards A05(50920), A08(51402, a A16 (50912) Must Be Installed. 1. TELEMETRY SCALING Confirm that test cables 37, 44, & 45 are properly connected between the Electronics Module & the Function Test Panel. Confirm that Test Cable P13 is connected to Function Test Panel. () 2. To simulate the Bulkhead (Frame) Sensor connect Decade Resistor #1 to TP's 3 and 9 on the FTP. To Simulate the Blackbody Sensor attach Decade Resistor #2 across TP's 5 and 11 on the FTP. To simulate the Silicon FPA sensor attach an External decade box across TP's 6 and 12. As an initial condition, set the Bulkhead, and Blackbody simulators at 05000 ohms, and silicon FPA simulaton at 03000 ohms (i.e., all simulators "hot"). 3. To measure the DC Restore signal to the MUX connect a DVM set on its 20V scale across the DC Restore TP and signal ground on the FTP. TITLE 5128 11323 Α 16704 SCALE TEV SHEET CEM NO 3/22 . 4 1-001 DIETERICH-POST CLEARPRINT OCON

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DATA SHEET NO. __2 OF 4 PARAGRAPH NO. 4.13 LOG AHR OPER SOO DETAILED FUNCTIONAL TESTS PARA PROCEDURE STEP SPEC RECORD OR OR DATUM/ UNITS STEP COMMAND | VERIFY NO. DC Restore - Telemetry Scaling Off 4.1 Execute commands: COOLER DOOR ELECTROMAGNET OFF/FRAME DC RESTORE SELECT 1 F (-)DC RESTORE OFF/TELEMETRY SCALING OFF 4.2 Verify via the CRT that digital Word L bit 1=0 bit 2=0 Verify via the CRT that analog 4.3 telemetry Channel 59 "Blackbody Temperature" ≤1.0 0.0 volts is ≤ 1.0 V. Channel 60 "SIFPA Temperature" 0-0 is 4 1.0V. ≤1.0 volts 4.4 Verify that the DVM is measuring C.0 < 0.1 zero volts volts Telemetry Scaling On/Backup DC 5.0 Restore Selected 5.1 Execute commands: (~) 7 TELEMETRY SCALING ON. COOLER DOOR ELECTROMAGNET OFF/FRAME DC RESTORE SELECT. 1 F (~) BACKUP SHUTTER ON/CALIBRATION SHUTTER OFF/DC RESTORE BACKUP. SITE CODE IDENT NO 11323 Α 16704

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DATA SHEET NO. _ 3 OF _4 PARAGRAPH NO. _ 4.13

DETAILED	FUNCTIONAL	TESTS

	<u> </u>	LOG A	HR OPE	3800
PARA OR STEP NO.	PROCEDURE STEP		RECORD DATUM / VERIFY	
5.2	Verify via the CRT that digital Word L bit 1=0 bit 2=1.			\$\$
5.3	Verify via the CRT that analog telemetry			
	Channel 59 is ≥ 2.5V Channel 60 is ≥ 2.5V.	≥ 2.5 ≥ 2.5	3.7	volts volts
5.4	Verify that the DVM is measuring zero volts.	<0.1	0.0	volts
6.0	TELEMETRY SCALING ON/NORMAL DC RESTORE SELECTED			
6.1	Execute Commands: TELEMETRY SCALING ON. COOLER DOOR ELECTROMAGNET OFF/ FRAME DC RESTORE SELECT. CALIBRATION SHUTTER ON/LACKUP SHUTTER OFF/DC RESTORE NORMAL SELECT.	7 1F		\$ \$
6.2	Verify via the CRT that digital Word L bit 1=0 - bit 2=1.	J J		(2)
6.3	Verify via the CRT that analog telemetry			
	Channel 59 is $\geq 2.5V$ Channel 60 is $\geq 2.5V$.	≥ 2.5 ≥ 2.5	<u>3.7</u> <u>4.7</u>	volts volts
6.4	Verify that the DVM is measuring zero volts.	<0.1	20	volts
7.	TELEMETRY SCALING ON/FRAME DC RESTORE SELECTED			
7.1	Execute Commands; TELEMETRY SCALING ON COOLER DOOR ELECTROMAGNET OFF/FRAME DC RESTORE SELECT	7 1F	<u></u>	(A)
7.2	Verify via the CRT that digital Word L bit 1=1 bit 2=1.		<u> </u>	(4)
7.3	Verify that the DVM is measuring ≤ 1.0 volts.	≤ 1.0	_,52	volts
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E.M. MODULE UNIT TEST	A 11323 NUMBER 16704
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		DATA SHEET NO OF	PARAGRAPH	NO. 4.13	3_
		DETAILED FUNCTIONAL		HR OPER	7 500
	PARA OR STEP NO.	מספרהווסר כדרה		RECORD DATUM/	UNITS
	7.4	Reset the Blackhody and Bulkhead simulators to 30000 ohms ("cold"). Reset the SiFPA simulator to 20000 ohms ("cold").			(v)
	7.5	Verify via the CRT that analog telemetry			
		Channel 59 is £1.0 volts Channel 60 is £1.0 volts	± 1.0 ± 1.0	<u>0.0</u> 	volts volts
	7.6	Verify that the DVM is now measuring ≥ 1.8 volts DC restore to the MUX.	≥ 1.8	1.62	volts
	3.0	Reset. Repeat 4.13.4.	50 60 3987A	<u></u>	(1/2)
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ì	. EST	ENGINEER DATE	16 Dec 14	L QA	<u>نب</u>
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PARAGRAPH NO. 4.16

DETAILED FUNCTIONAL TESTS

		LOGA	AR OPER	000
PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	
(4.16)	Note: In Order To Perform This Test Boards A03(50926) & A08(51402) Must Be Installed. LAMP SEQUENCER TEST			
1.	Confirm that test cable 44 is properly connected between the Electronics Module and the Function Test Panel.		V	(V)
	Connect test cable 20 and its breakout box to J20 on the Electronics Module.		<u>~</u>	(/)
2.	Calibration Lamp Sequencer On.			
2.1	Execute commands:			
	CALIBRATION LAMP 1 ON.	10		(~)
	CALIBRATION LAMP 2 ON.	11		(V)
,	CALIBRATION LAMP 3 ON.	12	<u> </u>	(V)
2.2	Verify via the CRT that digital			
	Word D bit 0 = 1		_4_	(V)
<u> </u>	bit 1 = 1			(~)
	bit 2 = 1.			(V)
2.3	Confirm that the three Cal Lamp LED indicators on the Function Test Panel are lit.			
2.4	Execute command :			
	CALIBRATION LAMP SEQUENCER OFF.	. 4E	<u></u>	(¹)

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E.M. MODULE UNIT TEST	SIZE	11323	16704	
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		DATA SHEET NO. 2 OF 3	PARAGRAPH	NO4.15	5
ļ		DETAILED FUNCTIONAL	TESTS LOG A	HR OPE	₹ <i>8</i> 00
	PARA OR STEP NO.	PROCEDURE STEP		RECORD DATUM/	UNITS
	(2.4)	CALIBRATION LAMP SEQUENCE ON.	4 D		(~)
	2.5	Verify via the CRT that digital		•	
		-			(V)
		Word D bit 6 = 1			()
					(1)
	2.6	Display analog telemetry Channel 8 "All Cal Lamps On" on the CRT.			(~)
	·	Verify that the Channel 8 telemetry switches from low (≤1.0V) to high (≥2.5V) every 23 ± 3 seconds, remaining high for 2 ± 1 seconds.	23±3/2±1	24	seconds
>	7	Observing the Cal Lamp LED indicators, verify visually that the lamps sequence in the pattern specified in Table 4.16A, with all lamps being lit when analog Channel 8 is high.			(~)
	2.8	Using a DVM confirm that test point J20-43 "Cal Lamp Sequencer Clock" cycles high and low (TTL logic).			(V)
	3.	Calibration Lamp Secuencer Off.			
	3.1	Execute command:			
	I	CALIBRATION LAMP SEQUENCER OFF.	4E		(~)
	3.2	Verify via the CRT that digital	;		
		Word D bit 6 = 0			(1)
	:	֥		<u>~</u>	(1)
			<u>!</u>	1	
ļ	EST {	ENGINEER / LOVION DATE	11 JAN 182	: _ QA _	2/3/0
		MODULE UNIT TEST A 113		16704	
		SCALE	I REV	SHEET B	

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DATA SHEET NO. 3 OF 3 PARAGRAPH NO. 4.15

DETAILED FUNCTIONAL TESTS

L	·	LOG A	HR OPEF	7 <u>600</u>
PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
3.3	Verify that analog telemetry Channel 8 is ≤1.0V for >40 sec. Reset.	≤1.0/≥40	0.000/ 120	volts/ sec.
4.1	Execute commands: CALIBRATION LAMP 1 OFF/ OVERRIDE OFF. CALIBRATION LAMP 2 OFF/ OVERRIDE OFF. CALIBRATION LAMP 3 OFF/ OVERRIDE OFF. Verify via the CRT that digital	16 17 18	\frac{\frac{1}{\sqrt{1}}}{\sqrt{1}}	
4.3	Word D bit 0 = 0 bit 1 = 0 bit 2 = 0. Verify that the Cal Lamp LED indicators are not lit.	·		
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EST	ENGINEER	1	-UY TON		DATE //	JAN 42	_ QA _	17/2/3/82
E. M.	MODULE	UNIT	TEST	SIZS A	11323	NUMBER	16704	
				SCALE	3EV	C	SHEET CO	

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STEP	LAMPS ON (50926)
1	NONE
2	1
3	1,2
4	2
5	2,3
6	1,2,3 (ALL)
7	1,3
8	3

Verify that step 8 occurs every 24 ± 3 sec.

Table 4.16A

SIZE	CODE IDENT NO	NUMMER			
A	11323		1670-		
SCALE	i REV	2	S. E.E.	5	

DATA SHEET NO. ____ OF ____ PARAGRAPH NO. 4 17 DETAILED FUNCTIONAL TESTS LOG AHR OPER 1000 PARA SPEC RECORD OR STEP DATUM / UNITS PROCEDURE STEP OR COMMAND **VERIFY** 定さいア が NO Note: In Order To Perform This Test Boards A09(50932) & Alo(50912) Must Be Installed. (4.17) COOLER DOOR TEST 1. Confirm that test cable 43 is properly connected between the Electronics Module and the Function Test Panel. (V) fitich test cable 20 and its breakout box to J20 on the Electronics Modula 1.1 Bet all cooler door switches on the Function Test Panel (ungrounded). Execute command: COOLER DOOR ELECTROMAGNET OFF/ FRAME DC RESTORE SELECT. 1 F COOLER DOOR MOVE INHIBIT. 88 COOLER DOOR MOTOR OFF. 53 llectromagnet off. 2.1 Execute command: COOLER DOOR ELECTROMAGNET ON. 1 5 2.2 Verify via the CRT that digital Word C bit 3 = 1. 2.3 Execute command: COOLER DOOR ELECTROMAGNET OFF! FRAME DC RESTORE SELECT. 1 F 2.4 Yearfy via the CTT that digital Word C bit 3 = 0 3. Break Release. Execute command: CCOLER DOOR MOTOR OFF. 53 3.1 erify via the CRT that digital 7 Dec (41 LIST ENGINEER DATE CODE DENT NO Size NUMBER 16704 Α MODULE UNIT SCALE I SHEET

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DATA SHEET NO. 2 OF 11

PARAGRAPH NO. 4.17

DETAILED FUNCTIONAL TESTS

	LOG AHR OPER_/OV			
PARA OR STEP NO.	PROCEDURE STEP	SPEC - OR COMMAND	RECORD DATUM / VERIFY	UNITS
3.1 -	Word Chit 4 = 0.		<u> </u>	()
3.2	Connect a DVM across the Cooler Door Brake TP's on the Function Test Panel, observing the proper polarities.			(.7
3.3	Execute commands:			
	COOLER DOOR MOTOR ON. COOLER DOOR MOVE INHIBIT. COOLER DOOR MOVE.	52 88 87	<u>- '-</u>	3
3.4	Verify via the CRT that digital Word I bit 4 = 1. C bit 4 = 1.		<u> </u>	{ \cdot \cdo
	Verify that the DVM is measuring 33 (230) VDC.	3 3 (:30)	31.9	volts
3.5	Execute command:			
1	COULER DOOR MOTOR OFF.	53	K	(1)
	COOLER DOOR MOVE INHIBIT.	88	<u> </u>	(1)
4.	Cooler Door Switches			
4.1	Door Closed. Set the cooler door switches on the Function Test Panel as follows:	-		
	"open" - down.	dova	<u> </u>	(~)
	"closed" - up (grounded).	up		()
	"outgas" - down.	down		(~)
4.2	Execute command:			
	cooler door motor on.	52		(10)
4.3	Verify via the CRT that digital			
	Word C Sit 0 - 1			(-7)
	b:c 1 → 0			(1-7

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E.M. MC	DULE	UNIT	TEST	A	11323	704619	16704	
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DATA SHEET NO. 3 OF 11

PARAGRAPH NO. 4.17

DETAILED FUNCTIONAL TESTS

		LOG A	HR OPER	7 /000
PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(4.3)	bit 2 = 0			(1)
	bit 4 = 1.			(~Y
4.4	Outgas position. Set the cooler door switches on the Function Test Panel as follows:			
	"open" - down.	,		(~)
	"closed" - down.			(4)
	"outgas" - up (grounded). Execute command: COOLER DOOR MOTOR ON.	52		55
4.5	Verify via the CRT that digital		į	
	Word C bit O = O		<u></u>	(4)
	bit 1 = 1		<u></u>	(1)
	bit 2 = 0			(1)
	bit 4 = 1.			(1)
4.6	Full open. Set the cooler door switches on the Function Test Panel as follows:			
	"open" - up (grounded).			(~)
	"closed" - down.			(~)
4.7	"outgas" - down. Execute command: COOLER DOOR MOTOR ON. Verify via the CRT that digital	_ 52	<u>~</u>	(F)
	Word C bit 0 = 0			(v)

EST	ENGINEER	<u> </u>	<u> </u>		DATE 72	(1)	_ QA _	· .
. M.	MODULE	UNIT	TEST	SIZE	11323	NUMBER	16704	
				SCALE	REV	2	SHEET . 3	

bit 1 = 0

bit 2 = 1

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DATA SHEET NO. 4 OF 11			_
DETAILED FUNCTIONAL	-	HR OPER	R 1000
PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM /. VERIFY	UNITS
bit 4 = 1. Reset. Set all switches down.		V	(1)
Execute command:			
COOLER DOOR MOTOR OFF.	53	V	(V)
Verify via the CRT that digital			
Word C bit 0 = 0			(~)
bit 1 = 0			(1)
bit 2 = 0			(V)
bit 4 = 0.			(V)
Motor Test			
Connect an oscilloscope to Door Motor Phase 1, No. 1 (+) TP and Door Motor Phase 2, No. 1 (+) TP on the Function Test Panel.			(4)
Door Opening.			
Execute commands:			
COOLER DOOR MOTOR ON.	52		(~)
COOLER DOOR OPEN.	85		(1)
COOLER DOOR MOVE INHIBIT.	88	<u> </u>	(LY
COOLER DOOR MOVE	87		(V)
· · ·	3	ł	1 1

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E. M.	MODULE	UNIT	TEST	A	11323	NUMBER 167	704
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(4.7) 4.8

5.1

PARAGRAPH NO. 4.17 DATA SHEET NO. ___ 5 OF __ 11 __ DETAILED FUNCTIONAL TESTS LOG AHR OPER 1000 PARA OR STEP SPEC RECORD PROCEDURE STEP OR DATUM / UNITS COMMAND VERIFY NO (5.1)Observe the phase 2 test point shifted 90° with respect to the phase 1 test (1) point. Photograph the waveform and attach it below: CRIGINAL PAGE IS OF POOR QUALITY - PHASE I - PHNG 2 5.2 Verify via the CRT that digital (~ Word C bit 4 = 1 (1) Word I bit 4 = 1 (~) 5it 5 = 1. 7 Dec (1/11 IST ENGINEER QΑ NUMBER SIZE CODE IDENT NO 16704 11323 E.M. MODULE UNIT TEST Α SCALE REV SHEET

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CRM HO 3122 A 3 SPT DIETERICH POST CLEARPRINE COOM

PARAGRAPH NO. 4.17 DATA SHEET NO. 6 OF 11 DETAILED FUNCTIONAL TESTS LOG AHR OPER 1000 PARA SPEC RECORD OR STEP DATUM / UNITS OR PROCEDURE STEP COMMAND VERIFY NO 5.3 Door Closing. Execute commands: CRIGINAL PAGE 192 COOLER DOOR MOTOR ON. OF POOR QUALITY COOLER DOOR CLOSE. 38 COOLER DOOR MOVE INHIBIT. 87 COOLER DOOR MOVE. 5.4 Observe the phase 2 test point shifted 2700 with respect to the phase I test point. Photograph the waveform and attach it below: - PHASE 1 + PHASE 2 DATE PDEC 4/1 EST ENGINEER? QA CODE -DENT NO SIZE 16704 E.M. MODULE UNIT Α SCALE 1 SEV SHEET

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DATA SHEET NO. _ 7 OF _ 11

PARAGRAPH NO. 4.17

DETAILED FUNCTIONAL TESTS

L			LOG A	HR OPE	₹ <u>/०००</u>	
	PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS	
	5.5 5.6	Verify via the CRT that digital Word C bit 4 = 1 Word I bit 4 = 1 bit 5 = 0. Connect the oscilloscope to Door Motor Phase 1, No. (+) TP and Door Motor Phase 1, No. (-) TP. Differentially measure voltage, frequency. (Note: since the door motor output is a clocked signal it may be necessary to reissue cooler door Move Enable command 88 87 periodically. Do so as needed.) Photograph waveform and attach below:	50(±12) 400(±12) ORIGINA	VERIFY 69 409 AL PAGE IS DR QUALITY	(/) (/) (/) Vp-p Hz	
		201				

EST	ENGINEER	<u> Vlor</u>	70		DATE 22	e- 181	_ QA	
€. M.	MODULE	UNIT	TEST	Size	11323	NUMBER	16704	,
				SCALE	PEV	€.	SHEET 7	

DATA SHEET NO. 8 OF 11 PARAGRAPH NO. 4.17

DETAILED FUNCTIONAL TESTS

		LOG A	HR OPER	7000
PARA OR STEP NO.	PROCEDURE STEP	7****	RECORD DATUM /	
5.7	Connect an oscilloscope to test points J20-44 "Phase 1, No. 1 Test" and J20-45 "Phase 1, No. 2 Test." Issuing command 38/37 as needed, verify that each test			(√)
5.8	point produces a 30 V p. s squarewave output Repeat 4.17.5.6 above for Door Motor Phase 2 outputs.	30(<u>+</u> 6)	30 V	Δ δ- > \$
	voltage	50(±12)	60 0	V p - p
	frequency	400 (= 12)	400 V	Hz
	Photograph: ORIGINAL FOF POOR Q	AGE IS VALITY		
			÷	· .

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E. M.	MODULE	UNIT	TEST	SIZE	11323	NUMBER	16704	
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DATA SHEET NO. _9 OF _11 PARAGRAPH NO. 4.17 DETAILED FUNCTIONAL TESTS LOG AHR OPER 1000 PARA SPEC RECORD OR UNITS PROCEDURE STEP OR DATUM / STEP COMMAND VFRIFY NO. 5.9 Connect an oscilloscope to test points J20-46 "Phase 2, No. 1 Test" and J20-47 "Phase 2, No. 2 Test." Issuing command 88 4 (/) 87 as needed, verify that each test point produces a 30V p-x squarewave output. 30 ± 6 30 V Vp-\\$ 6. Gated Clock Test 6.1 Execute command: COOLER DOOR MOVE INHIBIT. 88 (Verify via the CRT that digital Word I bit 4 = 0. (س) 6.2 Connect the oscilloscope across the Door Motor Phase 2 Outputs and set it for a slow sweep Rate. Execute command: COOLER DOOR MOVE 87 6.3 Verify that the door motor output waveform j4 u appears for $15(\pm 2)$ seconds. 15(±2) sec. Connect another oscilloscope to test point J20-48 "3.2 kHz Clock Test." (V Execute command 88/87 and verify a 3.2 kHz 3.2 KH3 TTL signal on J20-48. 3.2 ± 0.2 kHz Verify via the CRT that digital Word I bit 4 = 1. Set the Cooler Door Switch "Closed" in the 6.4 up (grounded) position. Execute commands 88/87. 88/87 DATE / Dec 1/1 EST ENGINEERS QA 517# CODE IDENT 40 NUMBER 16704 11323 E.M. MODULE UNIT TEST Α

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DATA SHEET NO. 10 OF 11 PARAGRAPH NO. 4.17

DETAILED FUNCTIONAL TESTS

		LOG AHR OPER 1000			
PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS	
(6.4) 6.5	ORIGINAL PAGE IS OF POOR QUALITY			()	
	COOLER DOOR MOVE INHIBIT.	88		()	
	COOLER DOOR MOVE.	87	<u></u>	(1)	
	Verify that the door motor output waveform appears across the Phase 2 outputs for $2.5(\pm0.2)$ seconds.	0.5(±0.2)	.61	sec.	
7.	Reset.				
7.1	Set all switches down.			(5)	
. 2	Execute commands:	IF			
	COOLER DOOR MOVE INHIBIT.	88	<u>v</u>	(1)	
	COOLER DOOR MOTOR OFF.	53	~	(V)	
7.3	Verify via the CRT that digital				
	Word C bit 0 = 0			(V)	
	bit 1 = 0			(V)	
	bit 2 = 0		<u> </u>	(V)	
	bit 3 = 0		<u> </u>	(V)	
	bit 4 = 0			(~)	
	Word I bit 4 = 0.			(V)	

EST	ENGINEER		70		DATE 72	e 1/1	_ QA _	
⊋ . M.	MODULE	UNIT	TEST	SIZE A	11323	NUMBER	16704	
				SCALE	REV		SHEET 20	



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		CMD	
Word/Bit	Function	<u>On</u>	Off
C/0	Cooler Door Closed	N/A	N/A
C/1	Cooler Door Outgas Position	N/A	N/A
C / 2	Cooler Door Full Open	N/A	N/A
C/3	Cooler Door Magnet On	1E	1 F
C/4	Cooler Door Motor On	52	53
I/4	Cooler Door Move Enable/Inhibit	87	88
I/5	Cooler Door Open	85*	86+

^{*} Door is Opening

Table 4.17

SIZE		NUMBER
A	11323	15704
SCALE	REV	. SHEET 121

t Door is Closing

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DATA SHEET NO. 1 OF 22

PARAGRAPH NO. 4.19

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1/60 PARA SPEC RECORD DATUM / PROCEDURE STEP OR UNITS COMMAND **VERIFY** (4.19) POST AMPLIFIER TESTS 1. Band 1 1.1 Connect cables between Electronics Module connectors J30 and breakout boxes and between J35 and breakout boxes. Verify that test cable 45 is connected between the EM and the FTP. 1.2 Short all unused signal inputs of Band 1 to their respective signal returns £(15) of 16 channels X (2inputs (HI/LO)) = 30 shorts. Short all signal returns to power return. Connect P11 and P12 (from the EM) and J11 and J12 extender cable (from the MUX) into the MUX Channel Selector Box. Select output channel via the Mux Channel Selector keyboard. 1.4 Connect breakout box between EM connector Pl3 and MUX Connector J13. Using the test Equipment Configuration shown in Figure 4.19, connect the DC Restore Sync Signal on P13-H3/H4 (breakout box PINS 38 and 39) to the "inhibit" input of the phase splitter, and to the triggers of both oscillo-(V) scopes. 1.5 Execute command: CALIBRATION SHUTTER ON/BACKUP SHUTTER ח OFF/DC RESTORE NORMAL SELECT. 25 BAND 1 ON. Verify via the CRT that digital

153T	ENGINEER	16	ins to	·	DATE &	1H2 1/2	QA - a/1/32
E. M.	MODULE	UNIT	TEST	A	11323	16	704
-				SCALE	364	. 5m	FT 7.

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DATA SHEET NO. 2 OF 22 PARAGRAPH NO. 4.19

DETAILED FUNCTIONAL TESTS

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PARA OR STEP NO.	PROCESURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(1.5)	Word B bit 0 = 1. Word G bit 2 = 1.		V	(/)
1.6	Set the function generator at 1 KHz. Adjust the sine wave so that it is all positive relative to DC Restore level and has an amplitude of 4 Vp-p out of the postamps.			(~)
1.7	Record the amplitude of the signal going into the postamps (E.g.: 1.2 Vp-p) in the data column of the Band 1 data table.		<u> </u>	(V)
1.8	Observe both sides of the Differential Signal from each Post Amplifier Channel and Verify that the signals are of equal amplitude and 180° out of phase with each other.		· <u>·</u>	(_V)
1.9	After steps 1.2 and 1.6-1.8 have been completed for each channel, execute command: BAND 1 OFF	26	V	(/)
	SHUTTERS OFF. Verify via the CRT that digital	F		(/)
	Word B bit 0 = 0. G bit 2 = 0. CRIGINAL PAGE IS OF POOR QUALITY		<i>V</i>	(
:				

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E.M. MODULE UNIT TEST	SIZE A	11323	16704	
	SCALE	1 484	I SHEET	

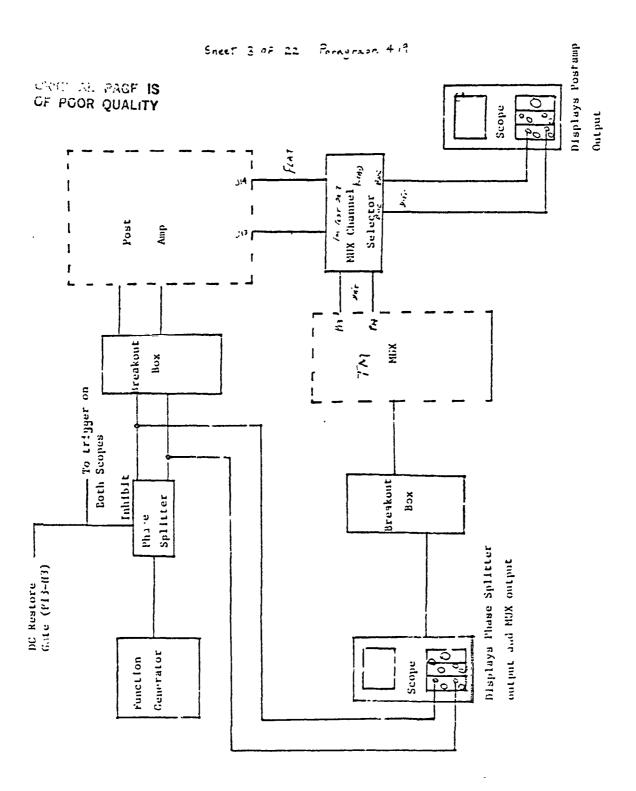


Figure 4.19

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	PARAMETER					Post Amp.	Post Amp	•	
1	Nominal Gain	7 0		Signal		output Reference	Input Spec	Actual	
•	Nominal Gain	7.0	Input	Ret	Output	Spec Limi	•	Data	Units
	Channel 1	ні	J30-C3	J30-C4	P11-A2	4(±3%)"PP	270≤V≤570	1440	mVp-p
		Lo	J30-C5	J30-C4	A1				
	2	HI	J35-K3	J35-K4	A 4			470	
		LO	J35-K5	J35-K4	A 3				İ
	3	HI	J30-D3	J30-D4	B1		•	490	
		LO	J30-D5	J30-D4	A 5				
	4	HI	J35-J3	J35-J4	В 3		,,, <u>,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,</u>	470	
		LO	J35-J5	J35-J4	B 2				
	5	HI	J30-E3	J30-E4	B 5			560	
		LO	J30-E5	J30-E4	В4				
	6	HI	J35-H3	J35-H4	C2			530	
		LO	J35-H5	J35-H4	Cl		·		
	7	HI	J30-F3	J30-F4	C4			480	
•		LO	J30-F5	J30-F4	C 3				
_	8	HI	J35-G3	J35-G4	D1			180	
		LO	J35-G5	J35-G4	C 5				
	9	HI	J30-G3	J30-G4	D 3			550	
	•	Lo	J30-G5	J30-G4	D 2				
	10	HI	J35-F3	J35-F4	D 5			190	
		LO	J35-F5	J35-F4	D 4				<u> </u>
	11	HI	J30-H3	J30-H4	E2			190	
		LO	J30-H5	J30-H4	E1				
	12	HI	J35-E3	J35-E4	E4			1440	
		LO	J35-E5	J35-E4	E3				<u> </u>
	13	HI	J30-J3	J30-J4	Fl			550	
		LO	J30-J5	J30-J4	E5				
	14	нІ	J35-D3	J35-D4	F3	:		450	
		LO .	J35-D5	J35-D4	F2			1	<u> </u>
	15	HI	J30-K3	J30-K4	F 5	 		460	
		LO	J30-K5	J30-K4	F∴	<u>!</u>		!	1
	10	HI	J35-C3	J35-04	62			,440	į
		LO	J35-C5	J35-C4	P11-G1	4(±3., WEE	27051 4570	:	n.Vn-p
	J.	See	E.O. 4059h	2 S S S S S S S S S S S S S S S S S S S	2E COCE	323 !	16704		
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DATA SHEET NO. 5 OF 22

PARAGRAPH NO. 4.19

DETAILED FUNCTIONAL TESTS

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PARA STEP STEO.	PROCEDURE STEP		SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(4.19)	POST AMPLIFIER TESTS			i	
2.	G _R	IGINAL POOR (PAGE IS QUALITY		
2.1	Connect cables between Electronics Moconnectors J31 and breakout boxes and between J36 and breakout boxes. Verthat test cable 45 is connected between EM and the FTP.	i ify		·	(•-)
2.2	Short all unused signal inputs of bar 2 to their respective signal returns [(15 of 16 channels X(2 inputs (HI/L) 30 shorts]. Short all signal return power return.))) =		<u> </u>	(4)
2.3	Connect Pll and Pl2 (from the EM) and and Jl2 Extender cables (from the MUZ into the MUX channel selector box. Sthe output channel via the MUX Channel Selector keyboard.	() Select		. 🗸	(-)
2.4	Connect breakout box between EM connect P13 and MUX connector J13. Using the equipment configuration shown in Figure 4.19, connect the DC Restore Sync. Signal on P13-H3/H4 (breakout box P13 and 39) to the "inhibit" input of the phase splitter and to the triggers of oscilloscopes.	e test ure NS 38 e		/	(~)
2.5	Execute command:	UTTER	D	~	()
į	BAND 2 ON.		27		(L)
	Verify via the CRT that digital WORD B bit 1 = 1. G bit 2 = 1.		·	V	(1)

TEST ENGINEER / / LOUT . 2		DATE Sol	11 1/2 QA	
E MODULE UNIT TEST	A	11323	16704	مهمتاة
	SCALE	1 3EV .	SHEET	

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DATA SHEET NO. _ 6 OF _ 22

PARAGRAPH NO. 4.19

DETAILED FUNCTIONAL TESTS

		LOG A	HR OPER	7/100
PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
2.6	Set the function generator at 1 KHz. Adjust the sinewave so that it is all positive relative to the DC Restore level and it has an amplitude of 4Vp-p out of the postamps.			(/)
2.7	Record the amplitude of the signal going into the postamps (E.G., 1.2 Vp-p) in the data column of the BAND 2 data table.			(🗸)
2.8	Observe both sides of the Differential Signal from each Post Amplifier Channel and verify that the signals are of equal amplitude and 180° out of phase with each other.		v	(🗸)
Q .9	After steps 2.2 and 2.6-2.8 have been completed for each channel, execute command:			
	BAND 2 OFF	28		(/)
	SHUTTERS OFF. Verify via the CRT that digital	F		(🗸)
	Word B bit 1 = 0.		V	(/)
	G bit 2 = 0. URIGINAL PAGE IS OF POOR QUALITY			(1/)
		·		
:				

TEST	ENGINEER	16	UYESN		DATE &	1AN'82	QA	12/1/42
●M.	MODULE	UNIT	TEST	SIZE	11323	NUMBER 167	704	
				SCALE	₹€٧	SHEE	τ .	

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ATA SHEET 7 of BAND PARAMETER	22		INAL PAGI POOR QUAI		Post Amp.	GRAPH 4.19	. 2	
- Nominal Gain	2.6 .	Input	Signal Ret	Output	output Reference Spec Limi	•	Actual	Units
Channel 1	HI	J31-C3	J31-C4	P11-G4	4(+3%)VPP	09¢ V<1990	1500	mVp−p
	LO	J31-C5	J31-C4	G3			1230	
2	HI	J36-K3	J36-K4	Н1			1300	
	LO	J36-K5	J36-K4	G 5			1	
3	нг	J31-D3	J31-D4	Н3			1/380	
	LO	J31-D5	J31-D4	Н2		•		
4	HI	J36-J3	J36-J4	H.5			1340	
	LO	J36-J 5	J36-J4	н4				
5	HI	J31-E3	J31-E4	J 2			1390	
	LO	J31-E5	J31-E4	J1				
6	HI	J36-H3	J36-H4	Ј4			1570	
	LO	J36-H5	J36-H4	J3				
7	HI	J31-F3	J31-F4	K1			1390	
	LO	J31-F5	J31-F4	J5				
8	HI	J36-G3	J36-G4	К3			1500	
	LO	J36-G5	J36-G4	· K2		•		
9	HI	J31-G3	J31-G4	K.5			1600	
	LO	J31-G5	J31-G4	K4				
10	HI	J36-F3	J36-F4	L 2			1350	
	LO	J36-F5	J36-F4	L1				
11	HI	J31-H3	J31-H4	L4			1550	
	LO	J31-H5	J31-H4	L3				
12	HI	J36-E3	J36-E4	Ml			1440	
	LO	J36-E5	J36-E4	L5				
13	HI	J31-J3	J31-J4	мз			1180	
	LO	J31-J5	J31-J4	M2				
14	HI	J36-D3	J36-D4	м5			1560	
	LO	J36-D5	J36-D4	м4				
15	HI	J31-K3	J31-K4	N 2			1230	
	LO	J31-K5	J31-K4	N1				
16	ΗI	J36-C3	J36-C4	N4			1500	
	10	J36-C3	J36-C4	P11-33	17 <u>-</u> 37) VPP - 4	39-1-1990		~¥;;->
	Sto	وه و معدد المعدد المعدد المعدد المعدد المعدد المعدد المعدد المعدد المعدد المعدد المعدد المعدد المعدد المعدد الم المعدد المعدد 19 17 5 1 Ani 172 5CA	11	GENT NO NUM	1 6 7 7 4 SHEET			

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DATA SHEET NO. 3 OF 22

PARAGRAPH NO. 4.19

DFTA	ILED	FUNC:	TIONAL	TESTS
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		LOG A	HR OPE	7/100
PARA OR STEP NO.	PROCEDURE STEP		RECORD DATUM/	UNITS
4.19	POST AMPLIFIER TESTS			
3.	Band 3			
3.1	Connect cables between Electronics Module connectors J32 and breakout boxes and between J37 and breakout boxes. Verify that test cable 45 is connected between the EM and the FTP.			· (レ)
3.2	Short all unused signal inputs of Band 3 to their respective signal returns [(15 of 16 channels X(2 inputs Hi/LO)) = 30 shorts]. Short all signal returns to power return.			(-)
3.3	Connect P11 and P12 (from the EM) and J11 and J 12 Extender cables (from the MUX) into the MUX channel selector. Select the output channel via the MUX Channel Selector Keyboard.			(L)
3.4	Connect breakout box between EM connector P13 and MUX connector J 13. Using the test Equipment Configuration shown in Figure 4.19, connect the DC Restore Sync signal on P13-H3/H4 (breakout box PIN 38 and 39) to the "inhibit" input of the phase splitter and to the triggers of both oscilloscopes.	-	V	(レ)
3.5	Execute command:	,		
	CALIBRATION SHUTTER ON/BACK SHUTTER OFF/DC RESTORE NORMAL SELECT.	ם		(L)
	BAND 3 ON.	29	<u></u>	(5-)
	Verify via the CRT that digital Word B bit 2 = 1. G bit 2 = 1.			(V)

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€M.	MODULE	UNIT	TEST	SIZE A	113	23	NUMBER	16704	
				SCALE		REV	`	SHEET	

DATA SHEET NO. 3 OF 22 PARAGRAPH NO. 4.19

DETAILED FUNCTIONAL TESTS

		LOG A	HR OPER	4 110 g
PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
3.6	Set the function generator at 1 KHz. Adjust the sinewave so that it is all positive relative to the DC Restore level and it has an amplitude of 4Vp-p out of the postamps.			(·)
3.7	Record the amplitude of the signal going into the postamps (E.g., 1.2Vp-p) in the data column of the Band 3 data table.			(/)
3.8	Observe both sides of the Differential Signal from each Post Amplifier Channel and Verify that the signals are of equal amplitude and 180° out of phase with each other.			()
3.9	After steps 3.2 and 3.6-3.8 have been completed for each channel, execute command:			
	BAND 3 OFF	2A		(/)
	SHUTTERS OFF. Verify via the CRT that digital	F		()
	Word B bit 2 = 0.			
	G bir 2 ≈ 0.			(🗸)
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₹. M.	MODULE	UNIT TEST	TEST	SIZE	11323	NUMBER	16704
				SCALE	SEA	S	SHEET 3

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DATA	SHEET 10 of	22			PAGE IS	P A	RAGRAPH 4.1	19.3	2 HG
BAND	PARAMETER		0	F POOR	QUALITY			13' مهر	, –
3	Nominal Sain = 3.4		Input	Signal Ret	Output	Reference Spec Limi	e Spec Lt Limit	Data	Units
	Channel 1	HI	J32-C3	J32-C4		4 (±3%) VPP	760 ≤V ≤1 66 0	1850	r.Vp-p
		LO	J32-C5	J32-C4			10 CO 4059 A	·	
	2	HI	J37-K3	J37-K4	р3		200	1400	18
		LO	J37-K5	J37-K4	P 2				
	3	ні	J32-D3	J32-D4	P 5			1950	
		LO	J32-D5 '	J32-D4	P 4			,,,,,,	
	4	HI	J37-J3	J37-J4	R2			2200	†
		LO	J37-J5	J37-J4	21				1
	5	HI	J32-E3	J32-E4	R4		<u>:</u>	1900	i
		LO	J32-E5	J32-E4	R3				İ
	6	HI	J37-H3	J37-H4	\$1	·		2000	
		LO	J37-H5	J37-H4	R5				
	7	HI	J32-F3	J32-F4	\$3	- <u></u>	•	1900	<u> </u>
		LO	J32-F5	J32-F4	S 2				
	8	HI	J37-G3	J37-G4	S 5		† 	2100	
		LO	J37-G5	J37-G4	S 4				
	9	HI	J32-G3	J32-G4	т2			1950	
		LO	J32-G5	J32-G4	T1			110	
	10	HI	J37-F3	J37-F4	T 4			2200	<u></u>
		LO	J37-F5	J37-F4	. тз		ļ		
	11	HI	J32-H3	J32H4	. U1	 		1950	<u>:</u>
		LO	J32-H5	J32-H4	T5			170	
	12	HI	J37-E3	J37-E4	<u> </u>	 	İ	1950	
		LO	J37-E5	J37-E4	ប 2				
	13	ні	J32-J3	J32-J4	บ 5			1950	İ
		LO	J32-J5	J32-J4				1	1
······	14	HI	J37-D3	J37-D4				2400	!
		LO	J37-D5	J37-D4				10.10	
	15	HI	J32-K3	J32-K4				1850	†
		LO	J32-K5	J32-K4		•		1, 3	1
	16	HI	J37-C3	J37-C4				2200	
		LO	J37-C5	J37-C4	?11-V5	4 (±3%) VPP	760 <u>V 1</u> 66 mVp-p	I.	d-dAm
		<i>[</i> <u>E</u> 0 y	<i>こ</i> ぇつ		1	1323	NUMBER 1670) 4	

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DATA SHEET NO. " OF 22 PARAGRAPH NO. 4.19

DETAILED FUNCTIONAL TESTS LOG AHR OPER 1100									
PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS					
(4.19) 4. 4.1.	POST AMPLIFIER TESTS. ORIGINAL PAG OF POOR QUA Connect cables between Electronics Module	E IS LITY							
-	connectors J33 and breakout boxes and between J38 and breakout boxes. Verify that test cable 45 is connected between the EM and the FTP.			(~)					
4.2	Short all unused signal inputs of Band 4 to their respective signal returns (15 of 15 channels X(2 inputs (HI/LO)) = 30 shorts . Short all signal returns to power return.		V	(~)					
4.3	Connect Pll and Pl2 (from the EM) and Jll and Jl2 extender cable (from the MUX) into the MUX Channel Selector box. Select the output channel via the MUX Channel Selector keyboard.		V	(~)					
4.4	Connect breakout box between EM connector P13 and MUX connector J13. Using the test Equipment Configuration shown in Figure 4.19, connect the DC Restore Sync Signal on P13-H3/H4 (breakout box pins 38 and 19) to the "inhibit" input of the phase splitter and to the triggers of both oscilloscopes.	-	V	(V)					
4.5	Execute command:								
	CALIBRATION SHUTTER ON/BACKUP SHUTTER OFF/DC RESTORE NORMAL SELECT.	D		~					
	BAND 4 ON. Verify via the CRT that digital	28	V	(レ)					
	Word B bit 3 = 1. G bit 2 = 1.			()					

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M. MODULE UNIT TEST	SIZE CODE IDENT	1	16704	
	SCALE	REV 1	SHEET 3 5	

DATA SHEET NO. ____ OF ___ PARAGRAPH NO. __4.19_

DETAILED FUNCTIONAL TESTS

			HR OPER	7/100
PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
4.6	Set the function generator at 1 KHz. Adjust the sinewave so that it is all positive relative to the DC Restore level and it has an amplitude of 4Vp-p out of the postamps.			(/)
4.7	Record the amplitude of the signal going into the postamps (E.g., 1.2 Vp-p) in the data column of the Band 4 data table.			(V)
4.8	Observe both sides of the Differential Signal from each Post Amplifier Channel and verify that the signals are of equal amplitude and 180° out of phase with each other.			(/)
4.9	After steps 4.2 and 4.6-4.8 have been completed for each channel, execute command:			
	BAND 4 OFF.	2C		(1/)
	SHUTTERS OFF.	F		(/)
	Verify via the CRT that digital			
	Word B bit 3 = 0. G bit 2 = 0.			(/)
	OF POOR QUALITY			

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E.M. MODULE UNIT TE	EST A	11323	NUMBER	16704	
	SCALE	SEA	Ž	SHEET 36	

DATA SHEET 13		22	ORIGI OF P	MAL PAGE	E IS	Post Amp.	ARAGRAPH 4.	19.4	
BAND PARAMETE	<u>R</u>			•		output	Post Amp. input		
4 Nominal Ga	ain =	1. 5	Input	Signal Ret	Output	Reference Spec Limi	•	Actual Data	Units
Channel	1	HI	J33-C3	J33-C4	P12-A2	4(+3%)VPP	1 1600 < V < 363	1750	⊒rVp−p
		LO	J33-C5	J33-C4	Al	-	9/2 10 50 4057 AC	料	•
	2	HI	J38-K3	J38-K4	A 4		1	1/700	1
		LO	J38-K5	J38-K4	A3				
	3	HI	J33-D3	J33-D4	B1			1750	
		LO	J33-D5	J33-D4	A 5				
	4	HI	J38-J3	J38-J4	В3			1500	
		LO	J38-J5	J38-J4	В2				
	5	HI	J33-E3	J33-E4	В 5			1950	
		LO	J33~E5	J33-E4	B 4				
	6	HI	J38-H3	J38-H4	C 2			1750	<u> </u>
		LO	J38-H5	J38-R4	Cl				
	7	HI	J33-F3	J33-F4	C 4			2000	
		LO	J33-F5	J33-F4	С3				
	8	HI	J38-G3	J38-G4	D1			1750	
		LO	J38-G5	J38-G4	C 5				
	9	HI	J33-G3	J33-G4	D3	•		1650	
,		LO	J33-G5	J33-G4	D 2			1	
	10	HI	J38-F3	J38-F4	D 5			1750	
		LO	J38-F5	J38-F4	D4				ļ
	11	HI	J 3 - H3	J33-H4	E 2		<u> </u>	1750	i
		LO	J33-H5	J33-H4	E1			1//	
	12	HI	J38-E3	J38-E4	E 4			1600	
		LO	J38-E5	J38-E4	E3			1600	İ
	13	HI	J33-J3	J33-J4	F1		i	1650	
		LO	J33-J5	J33-J4	E5		۶۳.	-	
	14	HI	J38-D3	J38-D4	F3			1650	
	_	LO	J38-D5	J38-D4	F2			1,00	
	15	HI	J33-K3	J33-K4	F5	 		1610	i
		LO	J33-K5	J33-K4	F4	•	1		
	16	HI	J38-C3	J38-C4	G2	······································	- 	1720	<u>'</u>
		LO	J38-C5	J38-C4	P12-G1	4 (±3%) v	bä 1600<∴<363		mVp-p
		Luy Jai	5,20 (a)	5 50	4 1	1323	16704		<u> </u>

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DATA SHEET NO. 14 OF ==

PARAGRAPH NO. _____

DETAILED FUNCTIONAL TESTS

	DETAILED TOTAL		HR OPE	R1100
PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(4.19)	POST AMPLIFIER TESTS.			
5.	Band 5			
5.1	Connect cables between Electronics Module connectors J41 and breakout boxes. Verify that test cable 45 is connected between the EM and the FT?.	Cradinal	PAGE IS	
5.2	short all unused signal inputs of Band 5 to their respective signal returns (15 of 16 channels X(2 inputs (HI/LO))= 30 shorts. Short all signal returns to power return.			
5.3	Connect Pll and Pl2 (from the EM) and Jll and Jl2 Extender cables (from the MUX) into the MUX channel selector box. Select the output channel via the MUX channel selector keyboard.			(Z)
5.4	Connect breakout box between EM connector P13 and MUX connector J13. Using the test Equipment configuration shown in Figure 4.19, connect the DC Restore Sync signal on P13-H3/H4 (breakout box pins 38 and 39) to the "inhibit" input of the phase splitter and to the triggers of both		,	(<i>'</i> ')
5.3	oscilloscopes. Execute command:			(0)
	CALIBRATION SHUTTER ON/BACKUP SHUTTER OFF/DC RESTORE NORMAL SELECT.	ם	<u></u>	(<)
	BAND 5 ON.	2 D	V	(~)
	Verify via the CRT that digital			
	Word B bit 4 = 1.		V	(V)
,	G bit 2 = 1.		<u></u>	(<)

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E.M.	MODULE	UNIT	TEST	Size	11323	NUMBER	16704	`
				SCALE	257	7	SHEET 3	3

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) 	_				
	DATA SHEET NO. 15 OF 23	·	PARAGRAPH	NO4.3	L 9 —
	DETAILED FUNCT	TIONAL		HR OPEI	R_//000_
PARA OR STEP NO.	PROCEDURE STEP		SPEC OR COMMAND	RECORD DATUM / VERIFY	
5.6	Set the function generator at LKH:	z . ` ` ·	ORIGINAL PA OF POOR QU	GE IS ALITY	
	Adjustinewave so that it is all position tive to the DC Restore level and an amplitude of 4Vp-pout of the	it has			
5.7	Record the amplitude of the signa into the postamps (E.g., 1.2 Vp-p) in the			(1/)
5.8	data column of the Band 5 data tall Observe both sides of the Differe Signal from each Postamplifier chand verify that the signals are amplitude and 180° out of phase weach other.	ntial annel f equal			(/)
5.9	After steps 5.2 and 5.6-5.8 have completed for each channel, execu command:		•	_ V_	(V)
	BAND 5 OFF. SHUTTERS OFF. Verify via the CRT that digital		2 E		(V) (V)
	Word B bit 4 = 0. G bit 2 = 0.		,		(/)
					7×.
EST E	ENGINEER VOUTON	DATE	سيد سند سيسين سيني سي	_ QA _	2/3/62
E. M.	MODULE UNIT TEST A	113		16704	
	SCALE		SEA ?	SHEET 19	

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DATA SHEET 16 of 22

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PARAGRAPH 4.19.5

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BAND	PARAMETE	<u> </u>					Fire A 7.5- it			1
5	Nom nel Gar	in = 24	٠ .	_	Signal		Post Amp Disut Reference		Actual	1
				Input	Ret		Spec Limit		Data	Units
	Channel	1	HI	J41-W1	J41-P4	i	4(±3%)vpp	110 < V < 360	150	шУр-р
			LO	W 2		G3		шар-Б		
į		2	HI	W 4		H).	1		120	
]			LO	W 5		G 5			70	
İ		3	HI	V 3		Н3			120	
ļ			LO	W 3		H2		!	120	
	I	4	HI	U 4		H 5				
			LO	ช 5		Н4		i	120	
		5	HI	T 1		J2	:	i	. 1 -	
			LO	т 2		Jl			120	
į		6	HI	R 4		J4		:	125	1
į			LO	R 5		J3		;	120	
		7	HI	Т3		К1		:	10 -	
į			LO	U3		J5		!	120	!
		8	HI	T4		· кз		i		
			LO	T 5		K2		!	120	
		9	HI	51		K.5				
			LO	S 2		K4			120	
		10	HI	s 3		L2				
			LO	R3		Ll		!	120	
1		11	HI	Rl		L4		i	. 4	
			LO	P1		L3		<u> </u>	120	i l
		12	HI	N1		Ml			. 4	
			LO	N 2		L.S		!	120	
İ		13	HI	M1		м3		ī		
			L9	Ll		M2			120	
: j		14	HI	<u> </u>		<u></u> M5	1	1 1		
ļ		• •	LO	N 4		M4	ļ		120	
Į. Į		15	HI	L3	-	N 2	<u> </u>	. ;		
		13	LO	M3		N1	·		120	1
<u>;</u>		1 ó				N4	<u>!</u>	·		
İ		10	HI	L4	**1 5/		1(=3%)/PP		130	
ļ			LO	J41-L5	J41-P4	P12-N3	1	110 €V ≤ 3 6 0 2-cV⊏	190	ק-קעב

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SIZE A	11323	NUMBER	16704
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~ARAGRAPH NO. 4.19 DATA SHEET NO. 17 OF _22_ DETAILED FUNCTIONAL TESTS LOGAHR OPER 1300 PARA SPEC RECORD OR STEP UNITS PROCEDURE STEP OR DATUM / COMMAND **VERIFY** ORIGINAL PAGE S 4.19 POST AMPLIFIER TEST. OF POOR QUALITY 6. Band 6 6.1 Connect cables between Electronics Modula connectors J40 and breakout boxes. Verify that test cable 45 is connected between (Y) the EM and the FTP. 6.2 Short all unused signal inputs of Band 1 to their respective signal returns (3 of 4 channels X(2 inputs (HI/LO)) = 6 shortsShort all signal returns to power return. 6.3 Connect Pl1 and Pl2 (from the EM) and Jl1 and J12 Extender cables (from the MUX) into the MUX Channel Selector box. Select the output channel via the MUX Channel keyboard. 6.4 Connect breakout box between EM connector P13 and MUX connector J13. Using the test Equipment Configuration shown in Figure 4.19, connect the DC Restore Sync signal on Pl3-H3/H4 (breakout box PINS 38 and 39) to the "inhibit" input of the phase splitter and to the triggers of both oscilloscopes. 6.5 Execute command: CALIBRATION SHUTTER ON/BACKUP SHUTTER OFF/DC RESTORE NORMAL SELECT. 2 F BAND 6 ON. 3 E DC RESTORE ON. Verify via the CRT that digital Word 3 bit 5 = 1. G bit 2 = 1. L bit 0 = 1.

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E. M.	MODULE	UNIT	ŢEST	3 1	11323	NUMBER	16704
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DATA SHEET NO. 18 OF 22

PARAGRAPH NO. 4.19

DETAILED FUNCTIONAL TESTS

		LOG A	HR OPE	R1500
PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
6.6	Set the function generator at lKHz			
	Adjust the sinewave so that it is all positive relative to the DC Restore level and it has an amplitude of 4Vp-p out of the postamps.		<i>\</i>	
6.7	Record the amplitude of the signal going into the postamps (E.g., 1.2 Vp-p) in the data column of the Band 6 data table.		V	()
6.3	Observe both sides of the Differential Signal from each Postamplifier channel and verify that the signals are of equal amplitude and 180° out of phase with each other.			
6.9	After steps 6.2 and 6.6-6.8 have been completed for each channel, execute			(/) ·
	command: SHUTTERS OFF	F		(~)
!	BAND 6 OFF	30		(V)
	DC RESTORE OFF/TELEMETRY SCALING OFF.	6		(~)
	Verify via the CRT that digita!		_	
	Word 3 bit 5 = 0. G bit 2 = 0. L bit 0 = 0.			

.EST	ENGINEER	<u>'}</u>	a Banach		DATE _	1/20/32	QA <u>1:/a</u> =
FM.	MODULE	UNIT	TEST	SIZE	1132	3	16704
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DATA SHEET 19 of 22

3AND 6 PARAGRAPH 4.19.6

PARAMETE	<u>R</u>		:	- -				1	1
Nominal G	a.r	: 20 ·	Input	Signal Ret		Post Amb Output Raference Spec Limit	Spec	Actual Data	Units
Channel	1	HI	J40-M1	J40-J1	P11-W3	4 (±3%) VPP	25≤₹≤250	200	mVp−p
		LO	N1		W 2		≖∧b-b	200	
	2	HI	м2		W 5			200	
•		LO) N2		P11-W4			200	
	3	HI	! мз		P12-W3			200	
		LO	из		W2			200	
	4	HI	M4		¥ 5			200	
		LO	J40-N4	J40-J1,	P12-W4	1 (13%) VPP	25 ≤V ≤250 mVp-p	200	⊒Vp−p

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DATA SHEET NO. (2) OF 22 PARAGRAPH NO. (4.19)

DETAILED FUNCTIONAL TESTS

		LOG AI	HR OPER	1100
PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(4.19)	POST AMPLIFIER TESTS.			
7.	Band 7			
7.1	Connect cables between Electronics Module connectors J42 and breakout boxes. Verify that test cable 45 is connected between the EM and the FTP.		1	(√)
7.2	Short all unused signal inputs of Band 7 to their respective signal returns [(15 of 16 channels X(2 inputs (Hi/LO)) = 30 short Short all signal returns to power return.			
7.3	Connect P11 and P12 (from the EM) and J11 and J12 Extender cables (from the MUX) into the MUX Channel Selector Box. Select the output channel via the MUX Channel Selector Keyboard.		V	(V)
7.4	Connect a breakout box between EM connector P13 and MUX connector J13. Using the test equipment configuration shown in Figure 4.19, connect the DC Restore Sync signal on P13-H3/H4 (break out box PINS 38 and 39) to the "inhibit" input of the phase splitter and to the triggers of both oscilloscopes.		IJ∕	~
7.5	Execute command: CALIBRATION SHUTTER ON/BACKUP SHUTTER OFF/DC RESTORE NORMAL SELECT.	D	<u></u>	(V)
	BAND 7 ON.	31		(6)
	Verify via the CRT that digital Word 3 bit 6 = 1. G bit 2 = 1.		<u> </u>	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\

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. M.	MODULE	UNIT	TEST	Size A	11323	NUMBER	16704
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DATA SHEET NO. ___ OF ___ PARAGRAPH NO. _4.19

DETAILED FUNCTIONAL TESTS

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	DE TAILLE TONOTIONAL		HR OPE	R_1100
PARA OR STEP NO.	PROCEDURE STEP		RECORD DATUM/	
7.6	Set the function generator at 1KHz. OR!G! OF PO	NAL PAGE IS OR QUALITY		
	Adjust the sinewave so that it is all positive relative to the DC Restoralevel and it has an amplitude of 4Vp-p out of the postamps.			
		•		(•)
7.7	Record the amplitude of the signal going into the postamps (E.G., l.2Vp-p) in the data column of the Band 7 data table.			(v)
7.S	Observe both sides of the Differential Signal from each Postamplifier channel and verify that the signals are of equal amplitude and 180° out of phase with each other.			
	_			(/)
7.9	After steps 7.2 and 7.6-7.8 have been completed, execute command:			
	BAND 7 OFF.	32		(V)
	SHUTTERS OFF.	F		
	Verify via the CRT that digital			
	Word B bit 6 = 0. G bit 2 = 0.		\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	3.5
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E.M. MODULE UNIT TEST	A 11323 NUMBER 16704	
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DATA SHEET 22 of 22

PARAGRAPH 4.19.7

BAND
7

PARAMETER		1					 	ī
Nominal Gai	n = 26 .	Input	Signal Ret	Output	Post Ame Output Reference Spec Limit	Spec	Actual Dața	Units
Channel 1	HI	J42-W1	J42-P4	P12-P1	4 (23%) VPP	90≤V≤300		_mVp-p
	LO	W 2		พ 5		mVp-p	100	1
2	HI	W4		Р3			120	1
	LO	WS		P 2		-]
3	HI	V3 .		_ P5			120	
	LO	! w3		P4				
4	ні	U4		R2			120	
	LO	ั บร		R1]
5	HI	T1		R4			120	
	LO	Т2		R3				Ì
6	HI	R4		S1			120	
	LO	R5		R 5				
7	HI	T3		\$3			120	1
	LO	U3		S 2				1
8	HI	T4		· S5			120	
	LO	T5		S 4]
9	HI	51		T 2			120	İ
	LO	S 2		T1				
10	HI	\$3		T4			10 %	
	LO	R3		Т3			120	
11	HI	R1		וט		1	120	
	LO	Pl		T 5				
12	HI	ил	1	U3			120	
	LO	N 2		U 2			120	<u> </u>
13	ні	M1	ĺ	ช 5			120	
	LO	L1		U4			120	
14	HI	M4	- [V 2	į	į	120	.
	LO	N4		71			100	
15	HI	L3		V4	. 1	Ì	120	
	LO	м3	<u> </u>	v ₃	1		100	
16	HI	L4		W1			_	
	LO	J42-L5	J42-P4	P12-V5	7,232 100	90≤V≤300 ¤Vp-p	120	πVp−p

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DATA SHEET NO. _1 OF 24

PARAGRAPH NO. 4.23

DETAILED FUNCTIONAL TESTS

		LOG A	HR ÖPE	R/X00
PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	
(4.23)	POWER SUPPLY HANDSHAKE			
1.	Remove PWB's A01 - A22, observing proper handling and record-keeping procedures.			(4)
	Verify that power distribution cables TJ46 and TJ47 are disconnected from the electronics module.			
2.	Install breakout boxes between the power supply and module connectors J46/P46 (Boxes 1,2) and J47/P47 (Boxes 3,4).	٠.		(A)
	Connect Bus Power Supply cable TPS 1 to power supply connector J19.			(%)
_	Execute commands: POWER SUPPLY 1 OFF. POWER SUPPLY 2 OFF.	3A TM-58 - 3B TM 51	<u></u>	(S)
	Turn on Bus Power at HP62743 power supply circuit breaker within the test set.			(4)
3.	Using a DVM verify at the breakout boxes that the cooler door parasitic load is in the system and measures $90(\pm 3)$ ohm. Measure at:			
	(+) P46-L4,M4 (Box 1-54,59) P46-L5,M5 (Box 1-55,60) P46-N4,P4 (Box 2-3,8) P46-N5,P5 (Box 2-4,9)	90 (<u>+</u> 3) 90 (<u>+</u> 3)	89.6 89.4	ohms ohms
4.	Non-Synchronous Mode-Redundant			
4.1	Verify that the Power Converter Sync Backup lines at P46-U5,V5 (Box 2-29,34) are switched open.			(4)
4.2	Execute commands: POWER SUPPLY 2 ON. MULTIPLEXER OFF (P/S 2). THERMAL SHUTDOWN ENABLED.	2 TO 02 3D TM 62 4 T · 94		\$33
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. M.	MODULE	UNIT	TEST	Size	11323		16704
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DATA SHEET NO. 2 OF 24 PARAGRAPH NO. 4.23

DETAILED FUNCTIONAL TESTS

		LOG A	HR OPER	1 / NOD
PARA OR STEP NO.	PROCEDURE STEP	i	RECORD DATUM / VERIFY	
4.3	Verify that the voltage across the parasitic load (see para. 4.23.3) is 30 ±3.0 vdc.	30(±3.0)	31.40	vdc
4.4	Execute command: MULTIPLEXER ON (P/S 2)	3C TM 60		⊗
5	Synchronous Mode-Redundant			
5.1	Execute command: POWER SUPPLY 2 OFF.	3B 74 57	<u> </u>	(S)
5.2	Close Power Converser Sync Backup lines at P46-U5, V5. (2:4 2-29/34)		_/_	(√)
5.3	Execute command: POWER SUPPLY 2 ON.	2		(∨)
5.4	Verify multiplexer 208(±6)kHz period TTL sync signal at P46-U5/V5 (Box 2-29/34)	208 <u>±</u> 6	208	kHz
5.5	Verify sync mode by observing ripple at sync carrier frequency at the Multiplexer +30v waveform output on P46-T1,V1 (Box 2-20,30)		<u></u>	(v)
5.6	Execute commands: MULTIPLEXER OFF (P/S 2). POWER SUPPLY 2 OFF.	3D TH 61 3B TO 57	<u>~</u>	\$\$
5.7	TURN OFF BUS POWER at HP62743 power supply.			(√)
5.8	Disconnect Bus Power Supply cable TPS1 from power-supply connector J19.		<u> </u>	⟨ ∨ ⟩
5.9	Connect Bus Power Supply cable TPS1 to power- supply connector J13.			K
5.10	TURN ON BUS POWER at HP62743 power supply.			(A)

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. M.	MODULE	UNIT	TEST	SIZE A	11323	16704
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DATA SHEET NO. 3 OF 24

PARAGRAPH NO. 4.23

DETAILED FUNCTIONAL TESTS

	DETAILED FUNCTIONAL	LOGA	HR OPER	7/800
PARA OR STEP NO.	PROCEDURE STEP	1	RECORD DATUM / VERIFY	
6.	Non-Synchronous Mode - Primary	-		
6.1	Verify that the Power Converter Sync lines at P46-R5,S5 (Box 2-14,19) are switched open.			√ √
6.2	Execute commands: POWER SUPPLY 1 ON. MULTIPLEXER OFF (P/S 1)	1 TA OI 8 TA OÌ	<u> </u>	(\$)
6.3	Verify that the voltage across the parasitic load (see para. 4.23.3) is 30(±3)vdc	30 (±3)	<u> 30.84</u>	vdc
6.4	Execute command: MULTIPLEXER ON (P/S 1)	5 70115		(∕)
6.5	Verify that the voltage across multiplexer power pins P46-T1,V1 (Box 2-20,30) reads 30(±3.9)vdc.	30 (±3. 9)	29.54	vdc
6.6	Execute command: POWER SUPPLY 1 OFF.	3A 74 58	<u> </u>	(v)
7.0	Synchronous Mode - Priracy			
7.1	Close Power Converter Sync lines at P46-R5,S5 (Box 2-14,19).		<u></u>	<>>
7.2	Execute command: POWER SUPPLY 1 CN.	1		(4)
7.3	Verify multiplexer 208 (± 6) kHz period TTL sync signal at P46-R5/S5.	208±6		kHz
7.4	Verify sync mode by observing ripple at sync carrier frequency atthe multiplexer +30v waveform output on P46-T1,V1 (Box 2-20,30).	, <i>"</i>		(√ 5)

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PARAGRAPH NO. 4.23

DETAILED FUNCTIONAL TESTS

	DETAILED TONCTIONAL		HR OPER	7/200
PARA OR STEP NO.	PROCEDURE STEP		RECORD DATUM / VERIFY	
7.5	Verify that all power forms are present.(Table 3.48) Note that unloaded power forms can be as much as +40% from nominally defined reference values as shown in Table 3.48.	,		ίγ
7.6 7.7 8.0 8.1 8.2	Execute command: POWER SUPPLY 1 OFF. TURN OFF BUS POWER at HP62743 power supply. Setup for Application of Electronic Loads to Power Install all PWB's. Add the following load simulation resistors to the breakout box at tip jacks away from power	3A TM ST	<u>/</u> /	(4) (5)
	Supply (white jacks). Load Nomenclature Value(ohm) Breakout Box Jacks (5%) From To SMA +28v 240, W 1-1,1-2 1-8 6 SMA -28v 240, W 1-11,1-12 1-8 7 SMA +7v 2.8,20W 1-16,1-21 1-17,1-22 1-26,1-31 1-27,1-132 Band 1,+19v PreAmps 360,2W 3-1 3-2 Band 2,+19v PreAmps 360,2W 3-8 3-7 Band 2,+19v PreAmps 360,2W 3-11 3-12 Band 3,+19v PreAmps 360,2W 3-18 3-17 Band 3,+19v PreAmps 360,2W 3-21 3-22 3and 3,-19v PreAmps 360,2W 3-21 3-22 3and 4,+19v PreAmps 360,2W 3-31 3-32 Band 4,+19v PreAmps 360,2W 3-31 3-32 Band 4,-19v PreAmps 360,2W 3-38 3-37 Band 5/7,+19v PreAmps 360,2W 3-41 3-42 Band 5/7,-19v PreAmps 360,2W 3-51 3-56 Band 6,+19v PreAmps 360,2W 3-51 3-56 Band 6,-19v PreAmps 360,2W 3-61 3-57	·		333333333333333

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PARAGRAPH NO. 4-23

DETAILED FUNCTIONAL TESTS

LOG AHR OPER/200 **SPEC** RECORD OR UNITS PROCEDURE STEP DATUM / COMMAND **VERIFY** 3.3 Open the following Breakout Box switches to initially disconnect all Electronic Module loads from the Power Supply. Breakout Box Switch Nomenclature SMA +28v 1-1 SMA +28v 1-2 80v 1-3 1-5 +8.5v 1-8 80v 1-10 +8.5v SMA -28v 1-11 1-12 SMA -28v +8v CDVU 1-14 +8v CDVU 1-19 1-21,1-16 SMA +7v 1-26, 1-31 SMA +7v +21v 1-29 1-30 +21v 1-39 -21v -21v 1-40 1-44 +33v 1-49 +33v

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. M.	MODULE	UNIT	TEST	Size	1132		16704
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PARAGRAPH NO. 423

(1)

Amps

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DETAILED FUNCTIONAL TESTS

LOGAHR OPER 1800 PARA SPEC RECORD OR UNITS PROCEDURE STEP OR DATUM / STEP COMMAND **VERIFY** NO. 8.3 Breakout Box switches Nomenclature to be opened 3-1, 3-6 3-3, 3-8 3and 1 +19V Band 1 -19V 3-11, 3-16 Band 2 +19V 3-13, 3-18 Band 2 -19V 3-21, 3-26 Band 3 +19V 3-23, 3-28Band 3 -19V Band 4 +19V 3-31, 3-36 Band 4 -1.9V 3-33, 3-38 Band 5/7 +19V 3-41, 3-46 Band 5/7 -19V 3-43, 3-48 Band 6 +19V 3-51, 3-52 3-61, 4-1 2-20, 2-21, 2-22, 2-23 2-25, 2-26, 2-27, 2-28 Band 6 -19V Multiplexer 30V (1) 8.4 (V) Turn on bus power at HP62743 power supply 9.0 SEQUENTIAL ELECTRONICS LOAD APPLICATION TO SIMULATE PICTURE MODE OF OPERATION. 9.1 Jumper across multiplexer 30V input break (V) out box jacks 2-20, 2-21, 2-22 and 2-23. Attach current probe around jumpers in order to measure transient and steady state load currents. (1) 9.2 Execute commands: Power Supply 1 multiplexer ON (V) Power Supply 1 ON (1)

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Е. М.	MODULE	UNIT	TEST	A	11323	REBMUM	16704	
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Photograph Transient Multiplexer Turn On

Measure steady state multiplexer current

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Current.

4.0 (+0.4) amps

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DATA SHEET NO. 7 OF =4

PARAGRAPH NO. 423

DETAILED FUNCTIONAL TESTS

	DETAILLD FONCTIONAL		HR OPER	3/800
PARA OR STEP NO.	PROCEDURE STEP		RECORD DATUM/	
9.2	Measure steady state multiplexer voltage at 2-20 ret 2-30	30.0(<u>+</u> 3.9)	29.6	VOLTS AMPS
	Execute Command: Power Supply l Multiplexer OFF	8 7447		(S
	Photograph transient Multiplexer turn off current			√s
	Execute Command: Power supply 1 Multiplexer ON	5 Tal' US		(⁄)
	Photograph transient multiplexer turn ON Current from initial condition of power supply ON.		·	
	Execute Command: Power Supply 1 OFF	3A Tm·5?		(·/s
9.3	Remove jumpers and current probe and close switches 2-20, 2-21, 2-22, 2-23, 2-25, 2-26, 2-27, 2-28.			
	Jumper across SMA $+7$ V input breakout box jacks on electronics module side of the switches.			(1
	Verify that 2.30 load is across break- out box jacks on electromics module side of the switches.			S
	Attach current probe around jumpers in order to measure transient load current.			(/i

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PARAGRAPH NO. 4.23

DETAILED FUNCTIONAL TESTS

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PARA POR P STEO STEO	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
9.4	Execute Command: Power Supply 1 ON Photograph transient +7V turn on current Measure steady state SMA +7V voltage Execute Command: Power supply 1 OFF Photograph transient +7V OFF current at power supply shutdown	1 7.0(±1.0) 3A 7 ²¹ 58	<u> </u>	(X) VVC (X)
9.5	Remove jumpers and current probe and closswitches 1-16, 1-21, 1-26, 1-31. Jumper across SMA ±28V Input breakout box jacks 1-1, 1-2, 1-11, 1-12. Attach current probe around jumpers across jacks 1-1 and 1-2 in order to measure SMA +28V transient load current.	5		(X) (X)
9.6	Execute Command: Power Supply 1 ON Photograph transient SMA +28V turn on current Measure steady state SMA +28V Execute Command: Power supply 1 OFF	1 28<0<30.5 3A 700.5	JO. 9 (2) 31. 2 36	(/) - VDC (/)

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DATA SHEET NO. 3 OF 24

PARAGRAPH NO. 4.23

	DETAILED TONCTIONAL		HR OPE	7/800
PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
	Photograph transient SMA +28V turn OFF current.			(1)
9.7	Remove current probe from around jumpers across jacks 1-1 and 1-2. Attach current probe around jumpers across jacks 1-11 and 1-12 in order to measure SMA -28V transient load current.		· V	(✓)
9.8	Execute Command: Power Supply 1 ON	1 70,01		(~)
	Photograph transient SMA -28V turn ON current Measure steady state SMA -28V 200 ED 4159 A	-37 > V>-31 -28=V>-30.5	-30.9	(✔) VDC
	Execute Command: Power Supply 1 OFF	3A Ten Ci		· ()</td
	Photograph transient SMA -23V turn OFF current.		<u>~</u>	(✓)
9.9	Remove jumpers and current probe and close switches 1-1, 1-2, 1-11, 1-12.			
	Jumper across CDVU +8V input breakout box jacks $1-\frac{1}{5}$, $1-\frac{19}{5}$.			(v)
	Attach current probe around jumpers acros jacks 1-14, 1-19 in order to measure CDVU +3V transient load current.	s	_/_	()
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DATA SHEET NO. 10 OF 24 PARAGRAPH NO. 4.23

		LOG A	HR OPE	R/yon_
PARA OR STEP NO.	PROCEDURE STEP		RECORD DATUM / VERIFY	
9.10	Execute Commands: - Macrodiscrete command generator A primary ON	35 70453		S
	Macrodiscrete command generator B primary ON	37 Tel 55		(4)
	Serial Command receiver 1 ON	33 Tal =:		(1)
	Power supply 1 ON	1 -1101		(>)
	Photograph transient CDVU turn on current		<u></u>	(~)
	Measure steady state CDVU +8V current		<u>a64</u>	Amps
	Measure steady state CDVU +8V voltage	8.0(±0.8)	7.45	ספע
	Verify on CRT that digital Word F-bit 2=1 Word F bit 4=1 Word A bit 4=1			\$33
	Execute Command: Power supply 1 OFF	3a 77 58		(/)
	Photograph transient CDVU turn OFF current.			(v)
9.11	Remove jumpers and current probe and close switches $1-14$ and $1-19$.			(N)
	Jumper across radiometer +8V input break- out box jacks 1-5, 1-10:- it ii	-		(1)
	Jumper across analog +21V input breakout box jacks 1-29, 1-30 and across analog -21V input breakout box jacks 1-39, 1-40.			(1)

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DATA SHEET NO		PARAGRAPH	NO. <u>423</u>
DETAIL ED	FUNCTIONAL	TESTS	

		DETAILED FONCTIONAL	LOG A	HR OPE	R_/100
	PARA OR STEP STEP	PROCEDURE STEP		RECORD DATUM/	
		Jumper across +33V electro Mechanical input breakout box jacks 1-44, 1-49. Attach current probe around jumpers across jacks 1-29, 1-30 in order to measure analog +21V transient load current. Verify that temperature simulating resistors used in para 4.21.4are still connected at the Function Generator test panel.			(1)
	9.12	Execute Commands: Main calibration Shutter On DC restore On Telemetry Scaling ON Calibration Lamp 1 ON Calibration Lamp 2 ON Calibration Lamp 3 ON Blackbody controller OFF Blackbody Controller ON CFPA heater/controller OFF CFPA controller ON Power supply 1 ON Scan line corrector ON #1 Cold Stage controller OFF Cold Stage controller ON Baffle heater controller OFF Baffle heater controller OFF Baffle heater controller ON Intermediate stage heater disabled	DE 767 167 167 167 167 167 167 167 167 167		<u> </u>
	.EST E	SIZE CODE IDE	1		
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DATA SHEET NO. 12 OF 24 PARAGRAPH NO. 423

		LOG A	HR OPE	R_/800
PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
9.12	Intermediate stage heater controller ON Power supply 1 OFF	46 Tm 70 3A 7m 53	<u>~</u>	55
	Photograph transient analog +21 turn OFF surrent.			(X
	Execute Command: Power supply 1 ON	1 70101	<u> </u>	W
	Photograph transient analog +21V turn on current.		<u> </u>	()
	Measure average analog +21V current.		<u>.880</u>	Amps
	Measure steady state analog +21V voltage	21(<u>+</u> 2.1)	22.6	VDC .
	Verify on CRT that digital Word B bit 7=1 Word D bits 0,1,2=1 Word F bit 0=1 Word G bit 0=1			33 33
	Word G bits Z,3,4=1 Word H bits _ O,2,4,7=1			(Y) (Y)
	Execute Command:			
	Power Supply 1 CFF	3A Tangg		(1)

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DATA SHEET NO. 13 OF 24 PARAGRAPH NO. 4.23

DETAILED FUNCTIONAL TESTS

		LOG A	HR OPE	R 1800
PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
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9.13	Remove current probe from around jumpers across jacks 1-29, 1-30. Attach current probe around jumpers across jacks 1-39, 1-40 in order to measure analog -21V tran sient load current.	·	<u></u>	S
	Execute Command: Power supply 1 ON	1.		(v)
	Photograph transient analog -21V turn ON current.		V 190	(v)
	Measure average analog -21V current		120	mA
	Measure steady state analog -21V voltage	-21 (±2.1)	-23.1	٧٥٩
	Execute Command: Power supply 1 OFF	3A -2.57		(~)
	Photograph transient analog -21V turn OFF current.			(~)
9.14	Remove current probe from around jumpers across jacks 1-39, 1-40. Attach current probe around jumpers across jacks at 1-44 and 1-49 in order to measure +337 elect mech transient load current.		<u> </u>	(v)

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DATA SHEET NO. 14 OF 24 PARAGRAPH NO. 4.23

DETAILED FUNCTIONAL TESTS

		LOG A	HR OPE	R 1800
PARA OR STEP NO.	PROCEDURE STEP		RECORD DATUM/	
	Execute Command: Power supply 1 ON	1	V	(1)
	Photograph transient +33V turn ON curren	.		· (A)
	Measure average +33V current see Photo		100	HA.
	Measure steady state +33V voltage.	33(<u>+</u> 3.3)	34_	VDC
	Execute Command: Power supply 1 OFF	3A 70.58		· (X)
	Photograph transient +33V turn OFF current.			(<i>V</i>)
.15	Remove current probe from around jumpers across jacks 1-44, 1-49. Attach current probe around jumpers across jacks 1-3, 1-19 in order to measure +8V radiometer transient load current.			(V)
9.15	Execute Command: Power supply 1 ON	1		(S
	Photograph transient +8V RAD turn ON current.			(1)
	Measure steady state +8V RAD current		200	MA
	Measure steady state +8V RAD voltage	8.5(<u>+</u> 0.85)	8.80	ADC
	Execute Command: Power supply 1 OFF	3A 7~ € (<u>~</u>	(v)
	Photograph transient +8V RAD turn OFF current			(٧)

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E.M. MODULE UNIT TE	ST A	11323	16704
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DATA SHEET NO. 15 OF 24_

PARAGRAPH NO. 4.23

DETAILED FUNCTIONAL TESTS

		LOG A	HR OPE	CAXLS
PARA OR STEP NO.	PROCEDURE STEP		RECORD DATUM/	
9.16	Remove jumpers and current probe and close switches 1-5, 1-10, 1-29, 1-30, 1-39, 1-40, 1-44, 1-49			(>)
9.17	Jumper across input to output at break- out box jacks: Band 1 +19V 3-1, 3-6 Band 1 -19V 3-3, 3-8		V	53
	Verify that termination jumpers still are installed in wearsaver connectors mounted to J31, J35.			(×)
	Attach current probe around jumpers across jacks 3=1, 3-6 in order to measur Band 1 +19V transient load current.	<u>.</u>		(V)
	Execute Commands: Band 1 ON Power supply 1 ON	25 ~ 37 1	<u> </u>	(y) (y)
	Photograph transient band 1 +19V turn ON current			()
	Verify on CRT that digital word B bit 0=1. Measure steady state +19V current		130 A	(5) MA
	Measure steady state +19V voltage at 3-1 ret 3-2	18~V <23	20.8	7DC
	Execute Command: Power supply 1 OFF	3Ai/	<u></u>	(~)
	- Photograph transient band 1 +19V turn OFF current		<u></u>	(~)

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E.M. MODULE UNIT TEST	A	11323	16704
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DATA SHEET NO. 16 OF 24

PARAGRAPH NO. 423

DETAILED FUNCTIONAL TESTS

LOG AHR OPER / PARA SPEC RECORD OR UNITS PROCEDURE STEP OR DATUM / I STEP COMMAND VERIFY NO 9.18 Remove current probe from around jumpers across jacks 3-1, 3-6. Attach current probe around jumpers across jacks at 3-3, 3-8 in order to measure Band 1-19V (~) transient load current. Execute Command: Power supply 1 ON 1 Photograph transient Band 1-19V turn ON current. (1) MA Measure steady state -19V current. Measure steady state -19V voltage at 3-3 ret 3-2|-18>V-23 VDC Execute Command: BA - = : = 8 Power supply 1 OFF (V) Photograph transient Band 1-19V turn OFF 1 (W) current 9.19 Remove jumpers and current probe and close switches 3-1, 3-6, 3-3,3-8, 3-11, 3-16, 3-13, 3-18 3-21, 3-26, 3-23, 3-28, 3-31, 3-36, 3-33, 3-38, 3-41, 3-46, 3-43, 3-48, 3-51, 3-52, 3-61, 4-1 (1) Verify that termination jumpers still are installed in wearsaver connectors mounted to J32, J36, J33, J37, J34, J38 (v) J40, J41 J42.

EST	ENGINEER	16	روم ب		DATE 15		QA
E.M.	MODULE	UNIT	TEST	A	11323	C	16704
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DATA SHEET NO. 17 OF 24

PARAGRAPH NO. +.23

	DETAILED FUNCTIONAL	LOG A	HR OPE	7800
PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
	Execute Commends:			
	Power supply 1 ON Band 2 ON	27 -4:39		() ()
	Verify on CRT that digital Word B bit l=1			(1)
	Measure steady state Band 2 +19V voltage at 3-11 ret 3-12	18 <v<23< td=""><td>20.5</td><td>VDC</td></v<23<>	20.5	VDC
	Measure steady Band 2 -19V voltage at 3-13 ret 3-12	-13>V>-23	-20.7	VDC
9.20	Execute Command: Band 3 ON	29 70:41		()
	Verify on CRT that digital Work B bit 2=1			()
	Measure steady state Band 3 +19V at 3-21 ret 3-22	18= V<23	20.4	VDC
	Measure steady state Band 3 -19V at 3-23 ret 3-22	-13>V>-23	-20.6	VDC
9.21	Execute Command: Band 4 ON	2B %: +3		()
	Verify on CRT that digital Word B bit 3=1			()

E.M. MODULE UNIT TEST A 11323 16704	EST ENGINEER Curo			18'Y- QA	
	E.M. MODULE UNIT TEST	S125 A	11323	16704	
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DATA SHEET NO. 2 OF 25 PARAGRAPH NO. 4.23

		LOG A	HR OPER	7/800
PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
	Measure steady state Band 4 +19V at 3-31 ret 3-32		20.5	ADC
	Measure steady state Band 4 -19V at 3-33 ret 3-32	-19>V>-23	-20.8	VDC
9.22	Execute Commands: Band 5 ON Band 7 ON	2D 31		£2.
	Verify on CRT that digital Word B bit 4= bit 4=1 Word B bit 6=			(A)
	Measure steady state Band 5/7 +19V at 3-41 ret 3-42.	19(<u>+</u> 1.9)	20.4	VDC
	Measure steady state Band 5/7 -19V at 3-43 ret 3-42	-19(<u>+</u> 1.9)	-20.4	VDC
9.23	Execute Command: Band 6 ON	2F 27		(~)
	Verify on CRT that digital Word bit 5=1			(17
	Measure steady state Band 6 +19V at 3-51 ret 3-56		20.4	VDC
	Measure steady state Band 6 -19V at 3-61 ret 3-56	-19(<u>+</u> 1.9)	-20.3	VDC

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DATA SHEET NO. 10 OF 24

PARAGRAPH NO. 4.23

DETAILED FUNCTIONAL TESTS

		LOG A	HR OPER	7/800
PARA OR STEP NO.	PROCEDURE STEP		RECORD DATUM/	
9.24	Attach current probe to power supply input at TJ1 cable wires for pins 2,3,5,6 to measure +28V spacecraft input current			(1)
	Execute Command: Power Supply 1 OFF	3A		(V)
·	Photograph 28V turn OFF current at nomina1/28(±0.5) VDC/with full picture mode load			(~)
	Execute Command: Power supply 1 ON	1		(1)
1	Photograph +28V turn ON current nominal line, full picture mode.			(1/)
	Measure steady state +28V S/C load current		11.5 de	- AMPS
9.25	Set S/C simulated line voltage to 35(+0, -0.5) VDC		<u> </u>	(5)
	Measure steady state S/C load current		<u>8.0</u>	AMPS
		·		

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DATA SHEET NO. 20 OF 24

PARAGRAPH NO. 4.23

DETAILED	FUNCTIONAL	TESTS
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PROCEDURE STEP	_				LOG A	HR OPE	R 1800
Momenclature	OR STEP	PROCEDURE	STEP		SPEC OR	RECORD DATUM/	
	, ,	during HI LINE at the out box test points: Nomenclature Multiplexer 30VDC SMA +28V SMA -28V SMA -28V SMA +7V SMA +7V SMA +7V SMA +7V Analog +21V Analog -21V Electro Mech +33V SMA (Isolated) +19V, no load SMA (Isolated) -19V, no load Band 1 +19V Band 2 +19V Band 2 -19V Band 3 -19V Band 3 -19V Band 4 -197 Band 5/7 -19V Band 6 -19V Band 6 -19V Bov No Load Execute Command:	following DVM (+) 2-20 1-1 1-11 1-14 1-16 1-5 1-29 1-39 1-44 4-6 4-16 3-1 3-3 3-11 3-13 3-21 3-23 3-31 3-31 3	DVM ret 2-30 1-6 1-6 1-15(8.5 ± 1-17 1-4 8(±.8) 1-34 1-34 1-34 1-45 4-11 4-11 3-2 3-2 3-12 3-12 3-22 3-32 3-32 3-3	28 < V < 30 . 5 . 4 -28 > V > -30 . 5 7 (+0 . 7) 8 . 5 (+0 . 8) 21 (+2 . 1) -21 (+2 . 1) 33 (+3 . 3) +19 (+82) -19 (-8 , +2) 18 < V < 23 -18 > V > -23 18 < V < 23 -18 > V > -23 18 < V < 23 -18 > V > -23 18 < V < 23 -18 > V > -23 18 < V < 23 -19 (+1 . 9) -19 (+1 . 9) -19 (+1 . 9) 80 V (+30 , -8)	30.94 30.7 8.8 6.9 5-7.5 22.3 -22.7 34.0 25.1 20.1 -20.6 -20.5 -20.6 -20.5 -20.5 -20.4 -20.5 -20.	VDC VDC VDC VDC VDC VDC VDC VDC VDC VDC

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E.M. MODULE UNIT TEST	Size A	11323	NUMBER	16704
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SPACE AND COMMUNICATIONS GROUP

HUGHES AIRCRAFT COMPANY
SPACE AND COMMUNICATIONS GROUP
EL SEGUNDO CALIFORNIA

FAILURE REPORT

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	EL SEGUNDO CALIFORNIA	I AILOITE	. WELOW	1			
Γ	1 PROGRAM NAME AND NUMBER 1 HE MATIC 11 A 12021	2 GLA	3 MODEL FLT	4 TIME OBSERVED	MO 2 DA / L YR / Z		
	B HARDWARE LEVEL C SPACECRAFT WHEN FAILURE WAS OBSERVED C SYSTEM		ASSEMBLY SUBASSEMBLY	C MODULE	C CARD		
	EQUIPMENT IDENTIFICATION	NAME	PART NUMBE		MANUFACTUPER		
	7 SUBSYSTEM		1		and ration th		
1	8 UNIT 6427-11116						
	ELECTIONS THEY	16	52347	701			
8	9 G ASSEMBLY G SUBASSEMBLY		ļ				
RIGINATO	10 MODULE MICAM CARD						
9			<u> </u>				
P	12 TEST WHEN DEVELOPMENT OBSERVED IN PROCESS			I LAUNCH OPERATIONS	•		
1	13 ENVIRONMENT MENT AMBIENT WHEN FAILURE TO EMC/RFI			THERMAL VAC	HRS AT		
1	WAS OBSERVED TO EMCLARI THE DESCRIPTION SIM A VELTICE.		Z ± 16 ,		_ [] OTHER		
	SEE ATTICHEN DATE		PER 1800)	45 = 27.5	· 7 · · · · · 2		
	CDVU and RADIUMETER TO			· · · · · · · · · · · · · · · · · · ·	- OUT UF		
	15 TEST PROCEDURE // 734		RIGINATOR	: SPECT - B	DATE 17 CONTINUATION		
\vdash	16 VERIFICATION AND	7.23.7	May Tol	1 22.13	HMAL/L SHEET USED		
NO		41. 4.23.3.21	SETS	ON YINE L	WAL SULYET		
EVALUATION	100 TS 21, +.5,	<u>-0;(/)^</u>	SHULD HA	יר שניבא ד	हराम) ता		
A	231+5-01VDC	<u>c</u>	DVU and Rad		a tolory- es should		
	have been reversed		AND PART NUMBE	R			
ENGINEERING	D FOLLOWING REWORK/RETEST REQUIRED DECAUSE		•				
EER	KETEST POL PAR	م ټورور <u>د ند. نه</u>	E0 4190) A			
Z	7						
EN		21 AUTHORIZATION	- 4	ORG	3-5-82 CONTINUATION		
	A REWORK PRETEST PARA 423.9				SYDC 24 CA EVERAL		
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A	EO41974 WERELTEN VI						
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12		1	The state of the s				
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3				-			
BA	27 REWORK BY CRG	DATE 28	RETESTED PY	ORG 2-13	DATE 29 CONTINUATION SHEET USED		
\vdash	TO CAUSE AND CORRECTIVE ACTION (AJSE: FILE	(B) (B)	1 Smark	- P2 - 5	25 = (2//50		
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NEE	34 BASIC CAUSE 1 DESIGN OF VERIFIED 1 ENVIRONMENTAL	TEST EQUIPMENT TEST PROCEDURE	AFG PROCEDURE	WANG ERROR	DEFECT CODE		
NG	FAILURE C DEFECTIVE PARTS 35 FAILURE C PRIMARY	G TEST SET UP G	38 FAILURE	WEAR OUT	ZWINGS		
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PARAGRAPH NO. 423

DETAILED FUNCTIONAL TESTS

1				LOG A	HR OPE	R_/KO2_]
PARA OR STEP NO.	PROCEDUR	E STEP		SPEC OR COMMAND	RECORU DATUM/ VERIFY	צדואני
9.25	Execute Command:					
	Power Supply 1 ON			1		(√)
	Photograph -S/C Turn (On Current				
	HI LINE, FULL PICTO	URE MODE			<u> </u>	(√)
9.26	Ser + S/C Simulated	d Line Volt	age to			
E0 4180 A	23 (1) 21(+0.5, -0) VDC					(/)
	Measure Steady State	S/C Load Cu	rrent		俊	5 15
	LO LINE				3	-Amp?
1	Measure Power Supply	Output Volt	ages			
]	during HI LINE at the	following	Breakout			
	Box test points		!			
	Nomenclature	DVM (+)	DVM ret		_	
	Multiplexer 30 VDC	2-20	2-30	30(<u>+</u> 3.9)	27.2	⊽ης
	SMA +28V	1-1	1-6	28 <v<30.5< th=""><th>27,5</th><th>УДС</th></v<30.5<>	27,5	УДС
	SMA -28V	1-11	1-6	-28>V>-30	27.5	VDC
SEE AIPPH.	1 3 1 4 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	/gr 1-14	1-15	8.5(±.85)	7,8	VDC JE
	SMA +7V 7/8 8343)1-16	1-17	7(+0.7)	6.2	ADC
50° 00° 3	-Radiometer -67	1-5	1-4	8,5(±3.85)	7)7.6	DDC JE
E04199A	Analog +21V	1-29	1-34	21(+2.1)	20.3	ADC
	Analog -21V	1-39	1-34	+21(<u>+</u> 2.1)	20.7	VDC
	<u> </u>					

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E.M. MODULE UNIT TEST	A 11323	16704
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DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1850 **SPEC** RECORD DATUM / LUNITS PROCEDURE STEP OR COMMAND VERIFY .25 Execute Command: (V) Power Supply 1 ON Photograph ·S/C Turn On Current ORIGINAL PAGE IS HI LINE, FULL PICTURE MODE (v')OF POOR QUALITY Set + S/C Simulated Line Voltage to € (+0.5, -0) VDC E0 4180A **(√)** Measure Steady State S/C Load Current LO LINE 14 Amps Measure Power Supply Output Voltages during RD LINE at the following Breakout Box test points Nomenclature DVM (+) DVM ret *3*0.3 VDC 2-30 30(+3.9)Multiplexer 30 VDC 2-20 SMA +2SV 1-1 SCV EC 4159 1-6 -32.7 SMA -28V 1-11 VDC 8.68 1-15 1-14 VDC 1-17 7(+0.7)7.17 SCV 1-_6 VDC 1-5 1-4 22.0 VDC 1-29 1-34 21(±2.1) Analog +21V -22.60 VDC -21(<u>-</u>2.1) Analog -21% 1-39 1-34

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M. MODULE UNIT	TEST A	11323	16704	
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DATA SHEET NO. _- OF _-

PARAGRAPH NO. _-:

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1850 'ARA SPEC RECORD DATUM / PROCEDURE STEP OR UNITS COMMAND VERIFY ΝO .26 Nomenclature DVM ret onf.) Electro Mech +33V 1-44 1-45 $33(\pm 3.3)$ 34.7 VDC. SMA (Isolated) +197 4-ó 4-11 +19(+8,-2)24.5 VDC no load 4-16 4-11 -19(-8,+2)SMA (Isolated) -19V -24.8 VDC no load 😘 Band 1 +197 3-1 3 - 218 < V < 23 20.8 VDC -20.7 Band 1 -19V 3 - 33-2 -18-V>-23 VDC 3 - 1218< V<23 +20.6 Band 2 +19V 3-11 VDC Band 2 -197 3-13 3-12 -18>77-23 -20.7 VDC 3-21 3-22 18< V< 23 20.6 Band 3 +19V VDC 3 - 233 - 22-18>V>-23 -20.9 Band 3 -19V VDC 3 - 3218 < V < 23 20.6 Band 4 +190 3-31 VDC -18> > -23 Band 4 -19V 3-33 3 - 32-21.0 VDC 19.8 Band 5/73-41 3-42 $+19(\pm 1.9)$ +19V VDC $-19(\pm 1.9)$ -20.0 .DC Band 5/7 -19V 3-43 3-42 20.4 Band 6 +19V 3 - 513-56 $+19(\pm 1.9)$ VDC 3 - 56 $-19(\pm 1.9)$ -20.2 VDC Band 6 -19V 3-61 1-13 80V(+30,-8) 102 COC 80V no load 1-3 ORIGINAL PAGE IS OF POOR QUALITY

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. M.	MODULE UNIT TEST	Sizs A	11323	NUMBER	16704
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DATA SHEET NO. 22 OF 2+

PARAGRAPH NO. - 22

DETAILED FUNCTIONAL TESTS

	LOG AHR OPER/200						
PARA OR STEP NO.	PRO	OCEDUF	RE STEP		ì	RECORD DATUM/	
9.26	Nomenclature		DVM (+)	DVM ret			
(Cont.)	Electro Mech	+33V	1-44	1-45	33(<u>+</u> 3.3)	30.7	VDC
	SMA (Isolated) +19V load	4-6	4-11	+19(+8,-2)	21.5	VDC
,	SMA (Isolated) -19V load	4-16	4-11	-19(-8,+2)	-21.6	VDC
	Band 1	+19V	3-1	3-2	18< V-23	18.5	VDC
	Band 1	-19V	3 - 3	3-2	-18>V>-23	-18.4	VDC
	Band 2	+19V	3-11	3-12	18< V<23	18.3	VDC
	Band 2	-19V	3-13	3-12	-18>V>-23	-18.5	VDC
*	Band 3	+19V	3-21	3-22	18< v< 23	18.4	VDC
	Band 3	-19V	3-23	3-22	-18>v>-23	-18.6	VDC
	Band 4	+19V	3-31	3-32	18< V< 23	18.3	VDC
	Band 4	-19V	3-33	3-32	-18>V>-23	- 18.7	VDC
	Band 5/7	+19V	3-41	3-42	+19(<u>+</u> 1.9)	18.6	VDC
	Band 5/7	-19V	3-43	3-42	-19(<u>+</u> 1.9)	-18.6	VDC
	Band 6	+197	3-51	3-56	+19(<u>+</u> 1.9)	18.b	voc
	Band 6	-19V	3-61	3-56	-19(<u>+</u> 1.9)	-18.6	VDC
	80V no load	ı	1-3	1-13	807(+30,-8)	94.9	VDC
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E.M. MODULE UNIT TEST	A 11323 NUMBER 16704
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DATA SHEET NO. 3 OF 3 PARAGRAPH NO. 422

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DETAILED	FUNCTIONAL	TESTS
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L		LOG A	HR OPE	2/800
PARA OR STEP NO.	PROCEDURE STEP		RECORD DATUM/	
9.26	Execute Command:			
(Cont.)	Power Supply 1 OFF	3A		(√)
	Photograph +S/C Turn Off Current			
	LO LINE, FULL PICTURE MODE			(√)
9.27	Execute Command:			
	Power Supply 1 ON	1		(₹)
	Main Calibration Shutter OFF	F		(√)
	Scan Line Corrector 1 OFF	40 % %	<u> </u>	(/)
	Power Supply 1 Multiplexer OFF	8		(√)
*	Close Breakout Box switch 1-3, 1-8			(√)
	Check SOV at test jack 1-3, ret 1-13 with Baffle Heater load applied		101.6	VDC
	(Check simulated thermistor at Function Panel)			
	Execute Commands:			
	Baffle Heater OFF	56 147.		(√)
	Cooler Intermediate Stage Heater OFF	47		(√)
9.29	Picture Mode Video Noise Level Check			
	Execute Commands:			
	Power Supply 1 Multiplexer ON	5		(√)
	Main Calibration Shutter ON	ם	<u>:. </u>	(√)

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E.M. MODULE UNIT TEST	A 11323 16704	
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		LOG A	HR OPER	3 X20
PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
9.29 (Cont.)	Scan Line Corrector 1 ON	4.8		(√)
(60112.)	Connect Breakout Box through mating con- nector at Multiplexer Test Access Connector J2			(v')
	Measure the background noise of the Electronics Module Post Amplifiers and Analog Portion of the Multiplexer at Band 1 Channel 1 Breakout Box Test Point			
	10 Return 61		<u> </u>	mVPP
	Photograph the Band I Channel I Noise Level			(√)
9.24	Execute Commands at Para. 4.22.2 for controlled System Load Shutdown			(√)
	Execute Command:			
	Power Supply 1 OFF	34		(v')
	THEMATIC MAPPER INTEGRATION OF ELECTRON- ICS MODULE TO MULTIPLEXER AND POWER SUPPLY IS COMPLETED.			
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E.M. MODULE UNIT TEST	A	11323	16704
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5.0 QUALITY ASSURANCE PROVISION

5.1 Notification of OA Engineer

The QA Engineer shall be notified before tests are performed. When possible, this notification should precede the test by one day.

5.2 Witnessing by O/. Engineer

The QA Engineer may witness any or all tests. He should be notified of a test even though he has waived the right to witness a previous test.

5.3 Handling of Flight Assemblies

All flight assemblies shall be handled in accordance with Assembly History Record Sheet Provisions.

6.0 PREPARATION FOR DELIVERY

6.1 Authorizing Signatures

The test data sheets must be signed by the Test Engineer and QA Engineer. When the QA Engineer has not witnessed the test, he should sign the data sheet after it is reviewed by the Design Engineer.

6.2 Distribution of Test Records

After the test data sheet is signed, place one (1) copy in the traveling file, one (1) copy and the original in the Engineering file, and one (1) copy will be provided for QA.

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DATA SHEET NO. _1 OF _4 PARAGRAPH NO. _4.5

-			LOG A	HR OPE	₹3800
8	PARA OR STEP NO.	PROCEDURE STEP		RECORD DATUM / VERIFY	
Ę,	(4.5)	Note: To Perform This Test Board A04-50942 must be installed. BLACKBODY CONTROL TEST			
	1.	Confirm that test cable 45 is connected properly between the Electronics Module and the Function Test Panel.		H	(J)
- 		Connect test cable 20 and its breakout box to J20 on the Electronics Module.		AF	(√)
	2.	To simulate the blackbody sensor, connect Decade Resistor #1 to the Blackbody Heater Input TP's on the Function Test Panel. Set DR #1 at 30000 ohms ("cold") to start.	د	Sto	(/ ₎
	3.	Backup On.			
	3.1	Execute commands: .			
1		BLACKBODY HEATER CONTROL OFF/ BACKUP OFF.	24		(/)
		BLACKBODY HEATER CONTROL ON/ TI SELECT	20		(/ ₎
1		BLACKBODY BACKUP ON.	23		()
1	3.2	Verify via the CRT that digital			,
		Word E bit 2 = 1			(V)
		bit 3 = 0		_ <u>~</u>	(1)
		bit 4 = 0 ORIGINAL PAGE IS			(V)
		bit 5 = 1. OF POOR QUALITY			(1)
ţ				!	
			•		

I ENGINEER /-UTTOW	DATE 25 FEB 52 QA 12	<u>.</u>
E.M. MODULE UNIT TEST	A 11323 NUMBER 16704	
	SCALE PER 1 SHEET	
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DATA SHEET NO. _2 OF _4_

PARAGRAPH NO. 4.5

		LOG A	HR OPE	K2000 1
PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
3.3	Verify via the CRT that analog telemetry		~ .	
	Channel 53 "Blackbody Current" is .5 < V < 1.5 volts.	.5 <u><</u> V≤1.5	1.14 -8-16-	volts
3.4	Using a DVM verify that test point J20-12 is in the range -12 < V < 0 volts.	-12 <v <0<="" td=""><td>-3.4</td><td>volts</td></v>	-3.4	volts
	Using a DVM verify that test point J20-11 is in the range .5 < V < 1 volt.	.5 <v <1<="" td=""><td>8</td><td>volts</td></v>	8	volts
4.	Normal Tl On.			
4.1	Execute commands:			
	BLACKBODY HEATER CONTROL OFF/ BACKUP OFF.	24	<u></u>	c√s
	BLACKBODY HEATER CONTROL ON/ T1 SELECT.	20	<u> </u>	رس)
4.2	Verify via the CRT that digital			
	Word E b1t 2 = 1			(V)
	bit 3 = 0		<u></u>	(7)
	bit 4 = 0 'RIGINAL PAGE IS			رک
	bit 5 = 0. OF POOR QUALITY			(1)
5.	Normal T2 On.			
5.1	Execute commands:			
	BLACKBODY HEATER CONTROL OFF/ BACKUP OFF.	24		(V)
•	BLACKBODY HEATER CONTROL ON/ T1 SELECT.	. 20	<u></u>	(1)

TEST ENGINEER LEVELY		DATE 2/85/8	2 QA - 372
E.M. MODULE UNIT TEST	SIZE	11323	16704
	SCALE	REV 1	SHEET
1.1 - 5	<u> </u>		

DATA SHEET NO. 3 OF 4 PARAGRAPH NO. 4.5

L		LOG AHR OPER 37-00				
	PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS	
	(5.1)	BLACKBODY T2 SELECT.	21		(V)	
	5.2	Verify via the CRT that digital		•		
	,	Word E bit 2 - 1			(V)	
1		bit 3 = 1 ORIGINA	PAGE IS		(V)	
		bit 4 = 0 OF POO	R QUALITY		(J)	
		bit 5 = 0.			(J)	
	6.	Normal T3 On.				
	6.1	Execute commands:	[
		BLACKBODY HEATER CONTRÓL OFF/BACKUP OFF.	24	<u>~</u>	(√)	
		BLACKBODY HEATER CONTROL ON/ T1 SELECT.	20		(V)	
	;	BLACKBODY T3 SELECT.	22		(~)	
Ì	6.2	Verify via the CRT that digital				
1		Word E bit 2 = 1			(V)	
		bie 3 - 0			(V)	
		bit 4 - 1			(~)	
		bit 5 = 0.		<u></u>	(/)	
	7.	Thermistor Test.				
	7.1	Set DR #1 at 05000 ohms ("hot").			(V)	
•		Verify via the CRT that analog telemetry Channel 53 is \$1.0V.	≤1.0	٥.٥_	volts	

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E.M. MCDULE UNIT TEST	Size A	11323	16704
	SCALE	1 egy 🛸	, SHEET

DATA SHEET NO. 4 OF 4

PARAGRAPH NO. 4.5

DETAILED FUNCTIONAL TESTS

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L _		LOG AHR OPER 30 W			
PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS	
7.2	Using a DVM verify that test point J20-12 is in the range 0 < V < 12 volts.	0 < V < 12	1,31	volts	
	Using a DVM verify that test point J20-11 is in the range 5 <v<.5< td=""><td>5<∇<.5</td><td>0.0</td><td>volts</td></v<.5<>	5< ∇<.5	0.0	volts	
7.3	Change DR #1 to 30000 ohms ("cold").		<u> </u>	(β)	
	Verify via the CRT that analog telemetry				
	Channel 53 is ≥2.5 volts.	≥2.5	3.72	volts	
8.	Reset Relays.				
8.1	Execute command:				
	BLACKBODY HEATER CONTROL OFF/ BACKUP OFF.	24		(J)	
8.2	Verify via the CRT that digital				
	. Word E bit 2 = 0		<u>v</u>	(/)	
	bit 5 ≈ 0.			(/)	
				!	
	ORIGINAL PAGE IS OF POOR QUALITY				

:TLST	ÉNGINEER	1/	VYTON		DATE A	25/8-	_ QA _	(12)
E. M.	MODULE	UNIT	TEST	A	11323	NUMBER	16704	
•				SCALE	954	•	SHEET	
*114 NO 1 .:	A 1 17 3 (199 CH 20)	" Lifestein"	icon	Δ				

DATA SHEET NO. 1 OF 5

PARAGRAPH NO. 4.6

DETAILED FUNCTIONAL TESTS

#			LOG A	HK OFE	12000
	PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
€.		Note: To Perform This Test Board A04(50942) Must be Installed. CFPA TESTING Confirm that test cable 40 is properly connected between the Electronics Module and the Function Test Panel. Connect test cable 20 and its breakout box to J20 on the Electronics Module. Connect DVM's set to their 20V scales to points J20-13 and J20-14 on the breakout box. To simulate the control diode connect Decade Resistor #1 across the CFPA Heater Control TP's on the Function Test Panel. Set DR #1 at 18000 ohms ("hot"). To simulate the monitor diode connect Decade Resistor #2 across the CFPA Monitor TP's on the Function Test Panel. Set DR #2 at 18000 ohms ("hot").		· \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	(/) (/)
	3.	CFPA Heater Monitor and Controller Off			
ļ	3.1	Execute commands:		·	_
	3.2	CFPA HEATER CONTROL ON/T1 SELECT/ CFPA TELEMETRY ON. CFPA TELEMETRY OFF. CFPA HEATER CONTROL OFF. Verify via the CRT that digital	19 1C 1D	\\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\	(/) (/) (/)
i		Word H bit 4 = 0 bit 5 = 0 OF FOOR QUALITY		<u> </u>	() ()

I_JT ENGINEER Jayra		DATE 2/3	5/8-	_ ·QA	<u> </u>
E.M. MODULE UNIT TEST	Size	11323	NUMBER	16704	
	SCALE	PEV	·	SHEET	

DATA SHEET NO. _2 OF _5_

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PARAGRAPH NO. 4.6

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 5800 PARA SPEC RECORD OR PROCEDURE STEP DATUM / UNITS STEP COMMAND VERIFY (V) bit 6 = 01 (3.2)(**/**) bit 7 = 0. 3.3 Verify via the CRT that analog telemetry Channel 68 "CFPA Heater Current" is ≤ 1.0 V. 0.0 ≤1.0 volts Channel 70 "CFPA Monitor Temperature" is ≤1.0V. 0.0 ≤1,0 volts Channel 67 "CFPA Control 0. U Temperature" is ≤1.0V. ≤1.0 volts 3.4 Verify that the DVM monitoring J20-13 "Cor rol Diode Output Test" is measuring in t = range $0 \le V < .1$ volts. $0 \le V < .1$ 0.0 volts Verify that the DVM monitoring J20-14 "CFPA Temp Error Test" is measuring in 0.0 the range $0 \le V < .1$ volts. 0 < V < .1 volts 4. CFPA Heater Controller Off 4.1 Execute commands: CFPA HEATER CONTROL ON/T1 SELECT/ $\langle \checkmark \rangle$ CFPA TELEMETRY ON. 19 (\checkmark) 1D CFPA HEATER CONTROL OFF. 4.2 Verify via the CRT that digital (V) Word H bit 4 = 0 ORIGINAL PAGE IS (/) bit 5 = 0OF POOR QUALITY (V) bit 6 = 0 $(\sqrt{})$

TLUT ENGINEER / JUYTU		DATE 2/25/1	<u> </u>	
E.M. MODULE UNIT TEST	SIZE	11323	16704	
	SCALE	PEV]	SHEET	
** NO . 11 A 1 4F 0 8788 CH POST 0 84898 NT 000H	A			

bit 7 = 1.

DATA SHEET NO. 3 OF 5 PARAGRAPH NO. 4.6

Verify via the CRT that analog telemetry

CFPA HEATER CONTROL ON/T1 SELECT/

Channel 68 is ≤1.0V.

CFPA TELEMETRY ON.

CFPA T3 SELECT.

CFPA HEATER CONTROL OFF.

Heater Controller Off/T3 On

Execute commands:

PARA

5.3

6.

6.1

LOGAHR OPER Stos

0.0

volts

(1)

(4)

 $(\sqrt{)}$

≤1.0

19

1D

13

DETAILED FUNCTIONAL TESTS

RECORD SPEC PROCEDURE STEP OR DATUM / UNITS STEP COMMAND VERIFY 4.3 Verify via the CRT that analog telemetry Channel 68 is \$1.0V. ≤1.0 0.0 volts Heater Concroller Off/T2 On 5. 5.1 Execute commands: CFPA HEATER CONTROL ON/T1 SELECT/ (1) CFPA TELEMETRY ON. 19 (1) CFPA HEATER CONTROL OFF. 1.D (J)CFPA T2 SELECT. 1.4 5.2 Verify via the CRT that digital (V) Word H bit 4 = 0CRIGINAL PAGE IS (/) OF POOR QUALITY bit 5 = 1**(/**) bit 6 = 0(1) bit 7 = 1.

T ENGINEER / Lynn	DATE 2/85/8- QA (3)
E.M. MODULE UNIT TEST	SIZE COCE CENT NO NUMBER A 11323 16704 SCALE REV 1 SHEET

*# 10 . . . A 5 17 0 1759 C- 4051 C.144441N1 COGH

DATA SHEET NO._4 OF 5

PARAGRAPH NO. 4.6

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DETAILED FUNCTIONAL TESTS

LOGAHR OPER 3702 PARA SPEC RECORD OR PROCEDURE STEP DATUM / UNITS OR. STEP COMMAND **VFRIFY** 6.2 Verify via the CRT that digital (1) Word H bit 4 = 0ORIGINAL PAGE IS OF POOR QUALITY (/) bit 5 = 0(V) bit 6 = 1(V) bit 7 = 1. 6.3 Verify via the CRT that analog telemetry 0.0 Channel 68 is ≤1.0V. **≤1.**@ volts Heater Controller On/T1 On 7. 7.1 Execute Command: CFPA HEATER CONTROL ON/T1 SELECT/ (1) CFPA TELEMETRY ON. 11'9 7.2 Verify via the CRT that digital (1) Word H bit 4 = 1 bit 5 = 0bit 6 = 0(V) bit 7 = 1. 8. Test Control Diode 8.1 With DR #1 set at 18000 ohms verify via the CRT that analog telemetry ≤1.0 volts Channel 67 is ≤1.0V. 0.0 Channel 68 is ≤1.0V. ≤1.© volts

TEST ENGINEER /	·····	DATE 2/25-/1-	- QA
E.M. MODULE UNIT TEST	SIZE	11323	16704
	SCALE	>£v .	I SHEET
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DATA SHEET NO. _5 OF _5 PARAGRAPH NO. 4.6

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DETAILED FUNCTIONAL TESTS

_!			LUG A	TK OPER	1 2003
S	ARA OR TEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	
(s	5.1)	Verify that $J20-13$ is in the range $.5 < V < 1.5$ volts.	.5 < V <1.5	_/.0_	volts
		Verify that J20-14 is in the range 0 < V < 15 volts.	0 < V <15	2.5	volts
` 8	8.2	Reset DR #1 to 19000 ohms. Record the level of analog telemetry channel 67		1.4	velts
		channel 68		6.0	volts
8	3.3	Reset DR #1 to 20000 ohms ("cold").			
1		Verify that analog telemetry			
		Channel 67 is ≥2.5 volts	≥2.5	4.96	volts
-		Channel 68 is ≥2.5 volts	≥2.5	4.86	volts
8	3.4	Verify that J20-13 is in the range .5 < V < 1.5 volts.	.5 <v <1.5<="" td=""><td>1.1</td><td>volts</td></v>	1.1	volts
		Verify that J20-14 is in the range -15 < V < 0 volts.	-15 <v 0<="" <="" td=""><td><u>~.5</u></td><td>volts</td></v>	<u>~.5</u>	volts
9	9.	Test Monitor Diode			
9	9.1	With DR #2 set at 18000 ohms verify that analog telemetry channel 70 is ≤1.0 volts.	≤1.0	0.0	volts
i 9	9.2	Reset DR #2 to 19000 ohms and observe the level of analog telemetry channel 70.		1,55	volts
9	9.3	Reset DR #2 to 20000 ohms ("cold"), and verify that analog telemetry channel 70 is >2.5V.	<u>≥</u> 2.5	<u> 5./</u>	volts volts
10	١.	Reset. Repeat 4.6.3.			(🗸)

TEST ENGINEER LEVYTA		DATE 2/15/62	_ QA
E.M. MODULE UNIT TEST	SIZE	11323	16704
	SCALE	l ago	SHEE"

DATA SHEET NO. ___ OF _3 PARAGRAPH NO. _4.8

DETAILED FUNCTIONAL TESTS

·		LUG A	HK UPE	7
PARA OR STEP NO.	PROCEDURE STEP	OR COMMAND	RECORD DATUM / VERIFY	
	NOTE: In Order To Perform This Test Boards			
(4.8)	DC RESTORE/CAL SHUTTER SENSORS	ORIGINAL	PAGE IS	
1.	Confirm that test cables 45, 46 and Pl3	OF POOR	QUALITY	
	are connected properly between the Electronics Module and the Function Test Panel Connect a DVM set on its 20V scale between the DC Restore TP and signal ground. If the Mux is already connected to the har-		_v	(J)
	ness, then use a breakout box and monitor connector P13, PINS M1 and M2.			(√)
2.	To simulate the Main Shutter Sensor, connect Decade Resistor #1 across TP's 1 and 7 on the FTP.			ر لی
	To simulate the Backup Shutter Sensor connect Decade Resistor #2 across TP's 2 and 8 on the FTP.			(/)
3.	DC Restore Off			
3.1	Execute commands: SHUTTERS OFF. DC RESTORE OFF/TELEMETRY SCALING OFF.	£	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	() (⁄)
3.2	Verify via the CRT that digital Word L bit 0=0.			(V)
3.3	Verify via the CRT that analog telemetry			
	Channel 61 "Calibration Shutter Temperature" is zero.	<0.1	.04	volts
	Channel 62 "Backup Shutter Temperature" is zero	<0.1	.04	volts
3.4	Verify that the DVM is measuring zero voltage.	. < 0.1	2.0	volts

TEST ENGINEER JEWAN		DATE 2/25/m	QA
E.M. MODULE UNIT TEST	A	11323	16704
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DATA SHEET NO. 2 OF 3 PARAGRAPH NO. 4.8

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DETAILED FUNCTIONAL TESTS

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8	PARA OR STEP NO.	PROCEDURE STEP		RECORD DATUM / VERIFY		
۲.	± .	DC Restore On/Normal Mode Select		·		
	4.1	Set DR #1 at 05000 ohms("hot").			(√)	
		Set Dr #2 at 30000 ohms ("cold").			(√)	
į	4.2	Execute commands:				
		DC RESTORE ON.	3E		(~)	
		CALIBRATION SHUTTER ON/BACKUP SHUTTER OFF/DC RESTORE NORMAL SELECT.	ס		(V)	
	4.3	Verify via the CRT that digital Word L bit 0=1.			(1)	
	4.4	Verify via the CRT that analog telemetry	_			
j		Channel 61 is ≤1.0V.	≤1.0	-0.0	volts	
İ		Channel 62 is ≥2.5V.	≥2.5	4.6	volts	
	4.5	Verify that the DVM is measuring ≤1.0V.	≤1.0		volts	
İ	4.6	Set DR #1 to 30000 ohms ("cold").			(~)	
		Set DR #2 to 05000 ohms ("hot").			(~)	
1	4.7	Verify via the CRT that analog telemetry				
i		Channel 61 is ≥2.5V.	≥2.5	4.6	vo¹ts	
į		Channel 62 is ≤1.0V.	≤1.0	0.0	volts	
	4.8	Verify that the DVM is measuring ≥1.8 volts.	> 1.45 > 1.8 566 & 31}7A	<u>1.59</u>	volts	
1	5.	DC Restore On/Backup Mode Select				
	5.1	Set D7 "1 at 05000 ohms		<u></u>	(1)	

	ENGINEER	160	/ / /	W	DATE 2/2	,-/1-	_ QA _	
. Ε. Μ.	MODULE	UNIT	TEST	SIZE	11323	NUMBER	16704	
				SCALE	j 2EV	`	SHEET	

Set DR #2 at 30000 ohrs.

DATA SHEET NO. 3 OF 3 PARAGRAPH NO. 4.8

DETAILED FUNCTIONAL TESTS

	· · · · · · · · · · · · · · · · · · ·	LOG A	HR OPE	R 5800
PARA OR STEP NO.	PROCEDURE STEP	I	RECORD DATUM/	
5.2	Execute commands:			
	DC RESTORE OFF/TELEMETRY SCALING OFF.	6	.0	(√)
	DC RESTORE ON.	3 E		(1)
	BACKUP SHUTTER ON/CALIBRATION SHUTTER OFF/DC RESTORE BACKUP SELECT.	E		(/)
5.3	Verify via the CRT that digital Word L bit 0=0.			(1/)
5.4	Verify via the CRT that analog telemetry			
	Channel 61 is ≤1.0V. Channel 62 is ≥2.5V.	≤1.0 ≥2.5	4.6	volts volts
د.د 5.6	Verify that the DVM is measuring ≥ 1.8 V. Set DR #1 to 30000 ohms.	1.45 ≥ 1.8 122 GO 39¥7A	_1.53 	volts
	Set DR #2 to 05000 ohms.			(V)
5.7	Verify via the CRT that analog telemetry			
	Channel 61 is ≥2.5V. Channel 62 is ≤1.0V.	≥2.5 ≤1.0	4.(volts volts
5.8	Verify that the DVM is measuring ≤1.0 volts	. ≤1.0		volts
6.	Reset. Repeat 4.8.3.			(1)
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I T ENGINEER Jay-w	DATE 2/25/Y- CA (172)	<u>-</u>
E.M. MODULE UNIT TEST	A 11323 NUMBER 16704	
	SCALE PE+ ' SHEE"	
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DATA SHEET NO. 1 OF 1 PARAGRAPH NO. 4.11

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OF	P00	R QUALITY	LOG A	HR OPE	R 5800
PA OF STI	RA P EP	PROCEDURE STEP		RECORD DATUM/	
(4.	11)	Note: In Order To Perform This Test Boards A01 & A02(52250-1, 52250 -2) Must Be Installed. SCAN LINE CORRECTOR TEST		·	
1.		Confirm that test cable 44 is connected properly between the Electronics Module and the Function Test Panel.			(Ι)
		Connect test cable 20 and its breakout box to J20 on the Electronics Module.			(J)
2.		SLC #1 On/SLC #2 Off			
2.	1	Execute commands:			
		SCAT LINE CORRECTORS OFF.	4C 4A	~	(√) (√)
2.	2	Verify via the CRT that digital			
		Word G bit 0 = 1			(/)
		bit 1 = 0.			(J)
2.	3	Verify via the CRT that analog telemetry			
		Channel 44 "SLC 1 Drive Current" is 2.5 ± 2.5V.*	2.5 ± 2.5*	2.50	volts
		Channel 46 "SLC 1 ± 15V" is 2.5 ± 0.3V.	2.5 ± 0.3	2.52	volts
		Channel 47 "SLC 1 + 5V" is 2.5 ± 0.1V.	2.5 ± 0.1	2.52	volts
1		* Waveform is a sawtooth thean in Equit 4 is			

TEST	ENGINEER		ليزسرين		DATE &	4- /r_	_ QA _	<u></u>
EM	MODULE	UNIT	TEST	A	11323	- Number	16704	,
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DATA SHEET NO. __2 OF_3_ PARAGRAPH NO. 4.11

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DETAILED FUNCTIONAL TESTS

LOG AHR OPERSOUS PARA RECORD SPEC OR STEP UNITS PROCEDURE STEP OR DATUM / I COMMAND VERIFY NO. Using an oscilloscope confirm that the 2.4 output of test point J20-1 "SLC 1 **(√)** Integrator" corresponds to Figure 4.11A. Fig. 4.11A Using an oscilloscope confirm that the output of J20-2 "SLC 1 Torquer Current" 2.5 corresponds to Figure 4.11B. Note reak amplifued (Vpk) Fig. 4.11B 2.6 Using an oscilloscope confirm that the output of J20-3 "SLC 1 Switch Tach" (/) Fig. 4.11C corresponds to Figure 4.11C. 3. SLC #1 Off/SLC #2 On 3.1 Execute command: SCAN LINE CORRECTOR 2 ON/1 OFF. (\checkmark) 4 B 3.2 Verify via the CRT that digital Word G bit 0 = 0bit 1 = 1. 3.3 Verify via the CRT that analog telemetry Channel 45 "SLC 2 Drive 2.8 $2.5 \pm 2.5*$ Current" is 2.5 ± 2.5V.* volts Channel 48 "SLC 2 ± 15V" 2.44 2.5 ± 0.3 1s $2.5 \pm 0.3V$. volts Channel 49 "SLC 2 + 5V" 2.47 is 2.5 ± 0.1V. 2.5 ± 0.1 volts * Waveform is a sawtooth shown in Figure 4116

ILST ENGINEER Jour Tial		DATE 2/25	1/8- QA_	
E.M. MODULE UNIT TEST	SIZE	11323	16704	
	SCALE	leev .	SHEET	

DATA SHEET NO. 1 OF 1 PARAGRAPH NO. 4.11

DETAILED FUNCTIONAL TESTS

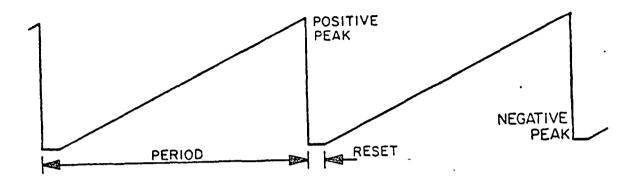
LOG AHR OPER 5800

		LOG A	HR OPE	3800
F.,RA OR ST: > NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
3.4	Using an escilloscope confirm that the output of J20-4 "SLC 2 Integrator" corresponds to Figure 4.11A.	Fig. 4.11A		(√)
3.5	Using an oscilloscope confirm that the output of J20-5 "SLC 2 Torquer Current" corresponds to Figure 4.11B. Note peak amplitude	Fig. 4.11B	<u> </u>	(Vək)
3.6	Using an oscilloscope confirm that the output of J20-6 "SLC 2 Switch Tach" corresponds to Figure 4.11C.	Fig. 4.11C	~	(J)
4.	SLC #1 Off/SLC #2 Off			
4.1	Execute command:			
	SCAN LINE CORRECTORS OFF.	4C .		(V)
2	Verify via the CRT that digital			ŀ
	Word G bit O = O			(1)
	bit 1 = 0.		<u></u>	(1)
4.3	Verify via the CRT that analog telemetry			
	Channel 44 is zero.	< 0.1	0_	volts
	Channel 45 is zero.	< 0.1		volts
	Channel 46 is zero.	< 0.1	. 0	volts
	Channel 47 is zero.	< 0.1		volts
	Channel 48 is zero.	< 0.1	. 0	volts
	Channel 49 is zero.	< 0.1		volts
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	ENGINEER	,	(- 1)		DATE 2/1	5/8- QA.	II)
E. M	. MODULE	UNIT	TEST	SIZE A	11323	NUMBER 16704	ļ
				SCALE) SEV	SHEE*	,

ORIGINAL PAGE 13 OF POOR QUALITY



PERIOD

71 mS ±3%

RESET

5.12mS ±3%

NOTE: 3% IS THE OSCILLOSCOPE'S ACCURACY. ACTUAL ACCURACY IS BETTER THAN 1%.

NEGATIVE PEAK -2V ±0.5V

POSITIVE PEAK +2V ±0.5V

FIGURE 4.11A

SIZE	CODE 10ENT NO.	16704		
SCALE	REV		SHEET	

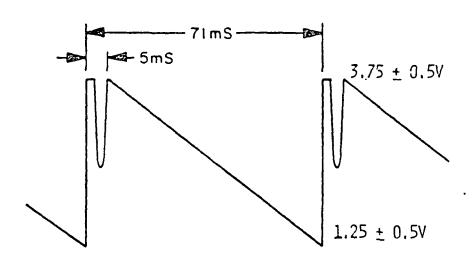


FIGURE 4.11B

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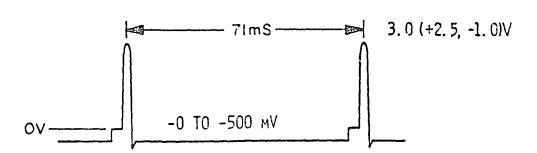


FIGURE 4.11C

SIZE	11323	16704
SCALE	REV	SHEET

DATA SHEET NO. 1 OF 3

PARAGRAPH NO. 4.12

ORIGINAL PAGE IS OF POOR QUALITY DETAILED FUNCTIONAL TESTS

	on Yourn	LOG AHR OPER 300			
PARA OR STEP NO.	PROCEDURE STEP	OR COMMAND	RECORD DATUM/ VERIFY	UNITS	
4.12)	Note: In Order To Perform This Test Boards A06(50916) & A07(51398) Must Be Installed. CAL SHUTTER CONTROL TEST				
1.	Confirm that test cable 45 is connected between J45 on the electronics module and TJ45 on the Function Test Panel.			⟨>>	
•	Connect test cable 20 and its breakout box to J20 on the Electronics Module.			(√)	
2.	MAIN SHUTTER ON/BACKUP SHUTTER OFF	İ			
2.1	Execute Commands: SHUTTERS OFF. CAL SHUTTER ON/BACKUP SHUTTER OFF/DC RESTORE	F		(4)	
	NORMAL SELECT.	D		(4)	
2.2	Verify via the CRT that digital Word G bit 2 = 1		<u> </u>	(4)	
	bit 5 = 0. Use TLMY Scan Mode (XBC00)			(1)	
2.3	Wait one minute, then verify that digital Word G bit 3 = 1			(4)	
	bit 4 = 1.			(1)	
2.4	Using an oscilloscope, Verify relationship of the following test points as shown in Figure 4.12a	·			
	J20-23 "7 Hz Test" J20-24 "DC Restore Sync Signal" J20-25 "16° Signal" J20-26 "0° Signal."			(y) (y) (y)	
	Using an oscilloscope, verify that test point J20-28 "Motor (+) Test" is toggling between gND and 20 VDC and that J20-29 "Motor (-) Test" is toggling between gND and 28 VDC. Frequency or period is indeterminant.			(/) (/)	
			1	t	

TEST ENGINEER JEUX-ON		DATE 2/25/5-	_ QA
E.M. MODULE UNIT TEST	A	11323	16704
	SCALE	1 5 E.A.	SHEET S8
UPW NG 111 A 2 18 2 1715 CH 725" C 84448 N 200H	45.		

DATA SHEET NO. 2 OF 3

PARAGRAPH NO. 4.12

	DETAILED FUNCTIONAL TESTS LOG AHR OPER 5800							
<i>F</i> ,	PARA OR STEP NO.	PROCEDURE STEP		RECORD DATUM/				
:	2.5	Using a DVM record test point J20-27 (- * 426 E04' "Amplitude Error" reading		2,5	VDC			
		Verify that a TTL "1" level signal is at test points J20-30 "Phase Unlock Test," and J20-31 "Amplitude Unlock Test."	> 2.4	4.cV	VDC(~)			
		After lock-up, jumper J20-32 to J20-51 and verify that J20-28 goes to 18 VDC (± 3) and that word G bit 3=0, bit 4=0.	. **	<u> </u>	(.)			
	3.	MAIN SHUTTER OFF/BACKUP SHUTTER ON						
	3.1	Execute command: BACKUP SHUTTER ON/ CAL SHUTTER OFF/ DC RESTORE BACKUP SELECT.	Ē		(4)			
)	<i>?</i>	Verify via the CRT that digital Word G bit $2 = 0$ bit $5 = 1$.		· V	(1) (1)			
	3.3	Wait three minutes, then verify that digital Word G bit 6 = 1 bit 7 = 1.		<u> </u>	(1) (1)			
İ	3.4	Using an oscilloscope.						
		Verify relationship of the following test points as shown in Figure 4.12b. J20-34 "7Hz Test" J20-35 "DC Restore Sync Signal" J20-36 "13° Signal" J20-37 "0° Signal".		\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	(4) (4) (4) (A)			
	3.5	Using a DVM, record test point J20-38 (ret A26 E04) "Amplitude Error" reading ORIGINAL PAGE IS OF POOR QUALITY		2_	VDC			

TLIT ENGINEER Javan		DATE 2/25/1-	_ QA _	1/2/
E.M. MODULE UNIT TEST	SIZE	11323	16704	
•	SCALE	5EA .	SHEET 30	
1284 NO 0 10 A 0 18 0 8188 CH 7051 (184888 NT 1808	A	<u></u>		

DATA SHEET NO. ___3 OF_3

PARAGRAPH NO. ____4.12

DETAILED FUNCTIONAL TESTS

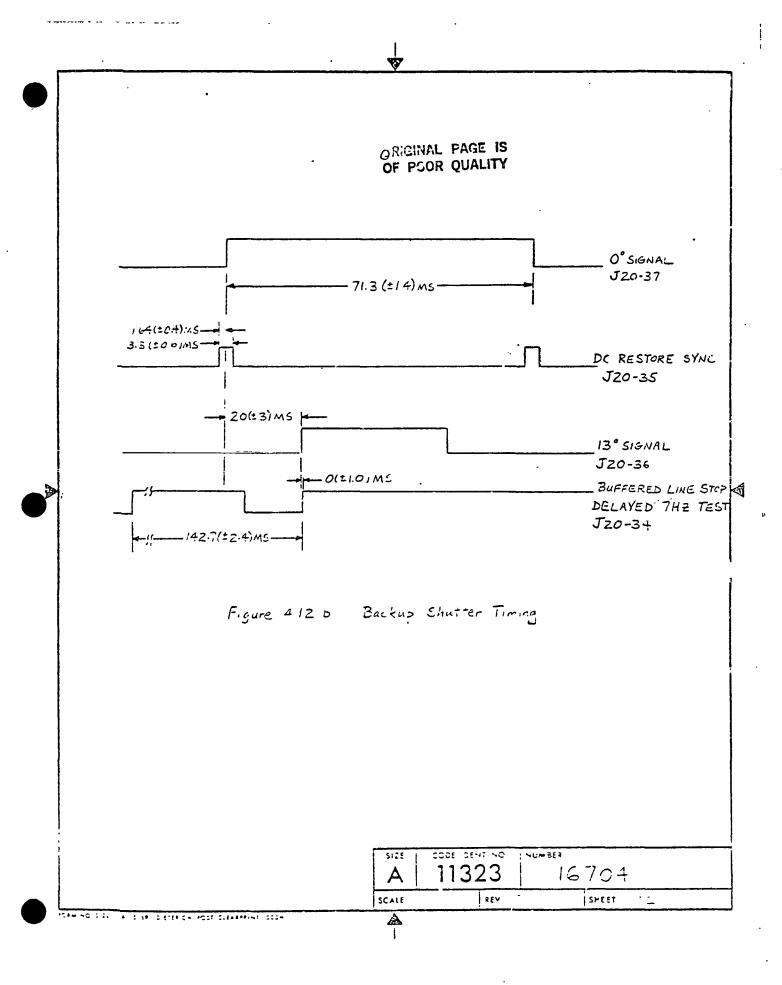
			LUG A	HR OPE	7 2000
O ST	RREPO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
. 4.	ontd)	Verify that a TTL level signal is at test points J20-39 "Phase Unlock Test J20-40 "Amplitude Unlock Test". BOTH SHUTTERS OFF	>2.4 >2.4	40	(1) ADC (1) ADC
4.3		Execute command: SHUTTERS OFF. Verify via the CRT that digital Word G bit 2 = 0 bit 3 = 0 bit 4 = 0 bit 5 = 0 bit 6 = 0 bit 7 = 0.	F	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	(4) (4) (4) (4) (4) (4)
		ORIGINAL PAGE IS OF POOR QUALITY			

TEST	ENGINEER	1	-47-50~		DATE 1/	QA -	
E. M.	MODULE	UNIT	TEST	Size	11323	16704	
				SCALE	>5<	SHEET 90	

A 1 F. ORIGINAL PAGE IS OF POOR QUALITY O'SIGNAL J20-26 -70 6(=1.8)-MS 0(=1.0)MS 0(=10)MS __ DC RESTORE SYNC J20-24 -24(±3)^{MS} 16 SIGNAL 1.43=.5 J20-25 0 (\$ 1.0) MS BUFFERED LINE STOP DELAYED THE TEST J20-23 -142.7(±2.4)MS-Figure 412a Main Shutter Timing

FLEW NO. 12 A 5 18 DETERIOR POST CLEARFRING COOK

<u>A</u>



DATA SHEET NO. __ OF_6_

PARAGRAPH NO. 4.14

OF POOR QUALITY DETAILED FUNCTIONAL TESTS

: [LOG ARR OPER				
	PARA STEP STEN	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS		
	(4.14)	Note: In Order To Perform This lest Board (ACS)(51-32) Pust Be Installed. FUSIBLE LINK TEST					
	1.	WARNING: When the Electronics Module is linked to Radiometer hardware shutter fusible link switch closure commands and cooler door fusible link switch closure commands shall not be transmitted if the flight plug (P14) is installed. Note that I+3 is connected to Fanction Test Panel. Install plug P14.			(/) ·		
		Connect a DVM across the Cooler Door Fusible Link Test Points.			(√)		
		Connect a DVM across the Main Shutter Fusible Link TP's.			(V)		
1		Set both DVM's to read in the 20V range.			(/)		
	2.	All Fusible Link Switches Open					
	2.1	Execute command:	•				
		FUSIBLE LINK SWITCHES OPEN	60		(1)		
	2.2	verify via the CRT that digital					
į		Word A bit 5 = 0			(V)		
		bit 6 = 0			(/)		
		bit " - 0			(1/2)		
		Word C bit 5 = 0			(1)		
		bit 6 = 0		<u> </u>	(1)		
ì		bit 7 = 0.	•	_ v	(1/)		
_					<u>[</u>		

TEST ENGINEER 1-04 TOX		DATE 24-15-	_ QA _	7/2/
E.M. MODULE UNIT TEST	Size A	11323	16704	
	SCALE	1.564	ISHEE"	

DATA SHEET NO. 2 OF 6 PARAGRAPH NO. 4.14

DETAILED FUNCTIONAL TESTS

		LOG A	HK OPE	7 3800
PARA OR STEP NO	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
2.3	Verify that the voltage across the Cooler Door Fusible Link TP's is ≤ 10 mV, and that the voltage across the Main Shutter Fusible Link TP's is ≤ 10 mV.	≤10	0.600	mvolts
3.	Cocler Door Fusible Link Switch A Closed			
3.1	Execute command: COOLER DOOR FUSIBLE LINK SWITCH A CLOSE.	5A		(√)
3.2	Verify via the CRT that digital			
	Word C bit 5 = 1			(√)
	bit 6 = 0			(/)
	ORIGINAL P.		V	(1)
	bit 7 = 0 OF POOR Q	PALITY	- -	
	Word A bit 5 = 0			(√)
	bit 6 = 0		V	(1)
			~	
	bit 7 = 0.			(1)
3.3	Verify that the voltage across the Cooler Door Fusible Link TP's and across the Main Shutter Fusible Link TP's is \$10mV.	≤ 1 0:		mvolts
4.	Cooler Door Fusible Link Switches A and B Closed.			
4.1	Execute commands:			
	COOLER DOOR FUSIBLE LINK SWITCH A CLOSE.	5 A		(J)
	COOLER DOOR FUSIBLE LINK SWITCH B CLOSE.	48		(\(\sigma \)

ΓEST	ENGINEER	1-	/ -U	and the second second	DATE 24	-11-	_ QA _	
E. M.	MODULE	UNIT	TEST	A	11323	HUMBER	16704	
				s SCALE	₹ ₹ √	-	SHEET	

DATA SHEET NO. 3 OF 6 PARAGRAPH NO. 4.14

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 5000

8'			LUG A	HK OPE	7 20 1
	PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	
	4.2	Verify via the CRT that digital Word C bit 5 = 1 bit 6 = 1 ORIGINAL P bit 7 = 0 FPOOR Q Word A bit 5 = 0 bit 6 = 0 bit 7 = 0. Verify that the voltage across the Cooler Door Fusible Link TP's and across the Main Shutter Fusible Link TP's is \(\frac{1}{2} \) mV. All Cooler Door Switches Closed/Cooler	AGE IS JALITY ≤10	1 1 2 2 2 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	(√) (√) (√) (√) (√)
Transformery to the second second second second second second second second second second second second second	5.1	Door Fusible Link Activated. Execute Commands: COOLER DOOR FUSIBLE LINK SWITCH A CLOSE. COOLER DOOR FUSIBLE LINK SWITCH B CLOSE. COOLER DOOR FUSIBLE LINK SWITCH C CLOSE. Verify via the CRT that digital Word C bit 5 = 1 bit 6 = 1 bit 7 = 1	5 A 4 8 5 C		

TEST ENGINEER / LUYTON	(DATE ZZT/F	QA
E.M. MODULE UNIT TEST	A	11323	16704
	SCALE	j = E v	SHEE*
** "2	A		

DATA SHEET NO. 4 OF 6 PARAGRAPH NO. 4.14

DETAILED FUNCTIONAL TESTS

!			LUG A	HR UPE	7 2 2
	PARA OR STEP STEP	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	
	(5.2)	Word A bit 5 = 0			(v')
		bit 6 = 0			(V)
	į	bit 7 = 0.			(1)
	5.3	Verify that the Cooler Door Fusible Link Sonalert is switched to the Alarm position and is sounding (it may be turned off after verification). Verify that the indicator LED is lit.		V	(√)
	5.4	Verify that there is 1.5V (+20%) across the Cooler Door Fusible Link TP's.	1.5 <u>+</u> 0.5	1,43	volts
	5.5	Verify that there is ≤i0 mV across the Main Shutter Fusible Link TP's.	≤10	1.5	mvolts
	(Reset all Switches. Repeat 4.14.2.		<u> </u>	(1)
	7.	Shutter Fusible Link Switch A Closed.			
	7.1	Execute command:			
•		SHUTTER FUSIBLE LINK SWITCH A CLOSE.	5 D		(V)
1	7.2	Verify via the CRT that digital			
		Word A bit 5 = 1		<u> </u>	(1)
		bit 6 = 0 CRIGINAL PA	GE IS		(/)
		bit 7 ≈ 0 OF POOR QU			(V)
1		Word C bit 5 = 0	,		(1)
:		bit 6 = 0		<u></u>	(V)
		5i: 7 = 0.	, -		(7)
		· · · · · · · · · · · · · · · · · · ·		r l	

ius E	ENGINEER	<u> </u>	בונד צוף		DATE Zhily	QA.	(1/2)
Ξ. M. I	MODULE	UNIT	TEST	A	11323	16704	
_				SCALE	1 95 4	, SHEE"	

DATA SHEET NO. 5 OF 6 PARAGRAPH NO. 4.14

DETAILED FUNCTIONAL TESTS

		DETAILED FUNCTIONAL	LOG A	HR OPE	3 5800
ę	PARA OR STEP NO.	PROCEDURE STEP		RECORD DATUM/	
<i>:</i>	· · · · · · · · · · · · · · · · · · ·	"erif" that the "oltage across the Cooler Door Fusible Link TP's and across the Main Shutter Fusible Link TP's is ≤10mV.	≤10	01.5	mvolts
	8.	Shutter Fusible Link Switches A and B Closed.			
1	8.1	Execute commands:			
·		SHUTTER FUSIBLE LINK SWITCH A CLOSE.	5 D		()
		SHUTTER FUSIBLE LINK SWITCH B CLOSE.	49	<u> </u>	()
	8.2	Verify via the CRT that digital			
j		Word A bit 5 = 1			<u>(</u> √)
		bit 6 = 1			(V)
		bit 7 = 0 OR:GINAL OF POOR	PAGE IS		()
		Word C bit 5 = 0	KONTILA		(/)
(bit 6 = 0			(/)
		bit 7 = 0.			(\(\sigma \)
	8.3	Verify that the voltage across the Cooler, Door Fusible Link TP's and the Shutter Fusible Link TP's are ≤10 mV.	<u> </u>	01.5	mvolts
	9.	All Shutter Switches Cloved/Shutter Fusible Link Activated.			
	9.1	Execute Commands:			
1		SHUTTER FUSIBLE LINK SWITCH A CLOSE.	. 50	<u> </u>	(v')

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E.M. MODULE UNIT TEST	A 11323 16704
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DATA SHEET NO. 6 OF 6 PARAGRAPH NO. 4.14

DETAILED FUNCTIONAL TESTS LOGAHR OPER 57"

<u>i_</u>			LUGA	IK OPER	30
1	PARA OR P STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
	(9.1)	SHUTTER FUSIBLE LINK SWITCH B CLOSE.	49		(J)
		SHUTTER FUSIBLE LINK SWITCH C CLOSE	5 F		(J)
	9.2	Verify via the CRT that digital			
		Word A bit 5 = 1		<u> </u>	(J)
		bit 6 - 1			(1)
		bit 7 = 1 ORIGINAL PAGE	IS		(√)
		Word C bit 5 = 0 OF POOR QUAL	TY		(V)
į		bit 6 = 0			(V)
1		bit 7 = 0.			(Y)
-	9.3	Verify that the Shutter Fusible Link Sonalert is switched to the Alarm position and is sounding. Verify that the indicator LED is lit.			(Js
	9.4	Verify that there is 1.5v(=20%)across the Shutter Fusible Link TP's.	1.5 - 0.5	1.44	volts
	9.5	Verify that there is ≤10mV across the Cooler Door Fusible Link TP's.	≤10	_1.5_	mvolts
	10.	Reset. Repeat 4.14.2.		. <u> </u>	(4)
	11.	Renove plug P14.	-		(V)
			ļ		

TEST	ENGINEER	1/4	17 W		DATE 2/	1-/1- QA	172
E. M.	MODULE	UNIT T	EST	SIZE A	11323	NUMBER 1670	4
				SCALE	1 964	SHEE*	

\$14 40 1 1 4 1 1/ 0 1/10 CH 105" C.FARPS Nº 0014

DATA SHEET NO. 1 OF 4

PARAGRAPH NO. 4.15

OF POOR QUALITY

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 5807

L			LOG A	HR OPE	7 5800
-	PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	
	1.	Dote: In Order to Perform This Test Board (105(5)-12) Mist Be Installed. BAFFLE HEATER TEST Confirm that test cable 44 is properly connected between the Elect; ics Module and the Function Test Panel.		·V	(\) ·
	2.	Connect test cable 20 and its breakout box to J20 on the Electronics Module. In order to simulate the Baffle Heater Controller thermistor, connect Decade			(J)
		Resistor #1 across the Baffle Heater Input Test Points on the Function Test Panel. Set DR #1 at 05000 ohms ("hot"). To simulate the Baffle Temp Sensor thermistor connect Decade Resistor #2 across TP's 4 and 10 on the Function Test Panel. Set DR #2 at 05000 ohms ("hot").		<u>/</u>	· · · · · · · · · · · · · · · · · · ·
	5.	To measure Baffle Heater Current connect a DVM across the Baffle Heater current Test Points on the Function Test Panel. The output will be measured in volts, with a scaling of 1 V indicating a 1 A current flow.			(√)
İ	4.	Heater and Backup Off.			
	4.1	Execute command: BAFFLE HEATER CONTROLLER OFF/BACKUP OFF.	5 6		()
	4.2	Verify via the CRT that digital Word F bit 0 = 0 bit 1 = 0.		_ <u>V</u>	(√) (√)
	4.3	Verify that the baffle heater current is ≤ 1 mA (≤ 1 mV reading on the DVM).	<u>≤</u> 1	0.0	mvolts
_		Verify that analog telemetry Channel 54 "Baffle Heater Current" is ≤ 1.0V.	<u>≤</u> 1.0	0.040	volts

: .TEST	ENGINEER	1/2000		DATE 2/	1-/2	QA _	
E. M.	MODULE	UNIT TEST	Size A	11323	TUMBER	16704	
.+			SCALE	1 351		SHEE" -	

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DATA SHEET NO. 2 OF 4

PARAGRAPH NO. 4.15

ORIGINAL PAGE IS OF POOR QUALITY

DETAILED FUNCTIONAL TESTS

OF P	OOK QUALITY	LOG A	HR OPEF	3863
PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
5.	Baffle Heater Controller Cn.			
5.1	Execute commands: TELEMETRY SCALING ON. BAFFLE HEATER CONTROLLER	7		()
	OFF/ BACKUP OFF.	56	<u></u>	(\)
	BAFFLE HEATER CONTROL ON.	54		(j)
5.2	Verify via the CRT that Digital Word F bit 0 = 1		<u> </u>	())
	bit 1 = 0.			())
5.3	Verify that the baffle heater current DVM is measuring ≤ 1 mV.	<u>≤</u> 1	0.0000	mvolts
5.4	Using a DVM verify that test point J20-41 "Baffle Temp Error Test" is in the range O <v<1v.< td=""><td>0<v<1< td=""><td>+<u>0.239</u></td><td>volts</td></v<1<></td></v<1v.<>	0 <v<1< td=""><td>+<u>0.239</u></td><td>volts</td></v<1<>	+ <u>0.239</u>	volts
	Using a DVM verify that test point J20-42 "Baffle Heater Current Test" is in the range 0 <v<.1v.< td=""><td>0<v<.1< td=""><td>0.0001</td><td>volts</td></v<.1<></td></v<.1v.<>	0 <v<.1< td=""><td>0.0001</td><td>volts</td></v<.1<>	0.0001	volts
5.5	Set DR #1 at 30000 ohms ("cold").			(1)
	Verify that the baffle heater current DVM is reading ≥ 300 mV.	<u>></u> 300	<u>553</u>	mvolts
	Verify that analog telemetry Channel 54 is ≥ 2.5 V.	<u>></u> 2.5	5.100	volts
5.6	Using a DVM verify that test point J20-41 is in the range 2 <v<15v.< td=""><td>2<v<15< td=""><td>4.66</td><td>volts</td></v<15<></td></v<15v.<>	2 <v<15< td=""><td>4.66</td><td>volts</td></v<15<>	4.66	volts
	Verify that test point J20-42 is in the range 0.2 <v<1v.< td=""><td>.2<v<1< td=""><td>0.704</td><td>volts</td></v<1<></td></v<1v.<>	.2 <v<1< td=""><td>0.704</td><td>volts</td></v<1<>	0.704	volts

TLOT ENGINEER JOUTON		DATE 2/2	-/e- QA -172)	:
E.M. MODULE UNIT TEST	Size	11323	16704	
	SCALE	2EV	SHEET	

DATA SHEET NO. ___ OF_4_

PARAGRAPH NO. 4.15

ORIGINAL PAGE IS OF POOR OUALITY DETAILED FUNCTIONAL TESTS

8	01 P(OOR QUALITY	LOG A	HR OPEF	7 3800
	PARA STEP STEO:	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
;	6.	Heater and Backup On.			
	6.1	Execute commands: BAFFLE HEATER CONTROLLER OFF/		•	
.		OFF/BACKUP OFF.	56	<u> </u>	(1)
		BAFFLE HEATER CONTROL ON	5 4	<u></u>	(\)
1		BAFFLE HEATER BACKUP ON.	55	<u></u>	(/)
1	6.2	Verify via the CRT that digital Word F bit 0 = 1			(\)
		bit 1 = 1.			(√)
 	3	Verify that the baffle current DVM is measuring ≥ 300 mV.	<u>≥</u> 300	37/	mvolts
		Verify that analog telemetry Channel 54 is ≥ 2.5 V.	<u>></u> 2.5	4.16	volts
1	7.	Reset/Controller On.			
	7.1	Execute commands: BAFFLE HEATER CONTROLLER OFF/			
i		BACKUP OFF.	56	<u></u>	(\)
İ		BAFFLE HEATER CONTROL ON	54		(v)
	7.2	Verify via the CRT that digital Word F			
		bit 0 = 1		<u> </u>	(V)
		bit 1 = 0.			(.)

TEST	ENGINEER_)/vy To _		DATE_	2/21/82	QA
E. M.	MODULE L	JNIT TEST	Size -	1132	NO NUMBER	16704
k			SCALE		sev -	SHEET :

DATA SHEET NO. 4 OF 4

PARAGRAPH NO. 4.15

OF POOR QUALITY DETAILED FUNCTIONAL TESTS

LOGAHR OPER 5500

L		LOG A	HR OPEF	3500
I .RA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
8.	Baffle Temperature Telemetry.			
8.1	Execute command: DC RESTORE OFF/TELEMETRY SCALING OFF.	6	~	(/)
8.2	Verify via the CRT that analog telemetry Channel 69 "Baffle Temperature" is ≤ 1.0 V.	<u><</u> 1.0	0.000	volts
8.3	Execute command: TELEMETRY SCALING ON.	7		(4)
8.4	Verify that analog telemetry Channel 69 is ≥ 2.5 V.	<u>≥</u> 2.5	5.0	volts
8.5	Reset DR #2 to 30000 ohms ("cold").			(V)
	Verify that analog telemetry Channel 69 is <1.0V.	<u><</u> 1.0	.44	volts
9.	Baffle Heater Off/Backup Off.			
1	Execute commands:			
	BAFFLE HEATER CONTROLLER OFF/ BACKUP OFF. DC RESTORE OFF/TELEMETRY SCALING OFF.	56		(√) '
İ		6		('')
9.2	Verify via the CRT that digital Word F bit 0 = 0			(V)
	bit 1 = 0			(v)_
	Word L bit 2 = 0.		<u></u>	(1)
9.3	Verify that the baffle current DVM is measuring ≤ 1 mV.	<u>≤</u> 1 m∀.	-\$.\$°	Huvolts
<u> </u>	Verify that analog telemetry Channel 54 is ≤ 1.0 V.	· <u><</u> 1.0	0.0	volts

. . ,	T	ENGINEER		44702		DATE 2/21/6-	$\underline{\qquad}$	
 E. N	Λ.	MODULE	UNIT	TEST .	A	11323	16704	
•		_			SCALE	j sén	SHEET	
					^			_

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ORIGINAL PAGE IS DETAILED FUNCTIONAL TESTS

OF POOR QUALITY

LOG AHR OPER 5703

	FUOR QUALITY	LOG A	HR OPE	7 5 500
PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(4.17)	Note: In Order To Perform This Test Boards A09(50932) & A16(50912) Must Be Installed. COOLER DOOR TEST			
1.	Confirm that test cable 43 is properly connected between the Electronics Module and the Function Test Panel.			(v)
	Attach test cable 20 and its breakout box to J20 on the Electronics Module			(_V)
1.1	Set all cooler door switches on the Function Test Panel (ungrounded).			
	Execute command: COOLER DOOR ELECTROMAGNET OFF/ FRAME DC RESTORE SELECT. COOLER DOOR MOVE INHIBIT. COOLER DOOR MOTOR OFF.	1F 88 53		()))))))))))))))))))
2.	Electromagnet off.			
2.1	Execute command: COOLER DOOR ELECTROMAGNET ON.	1£		(_{\$} 2)
2.2	Verify via the CRT that digital Word C bit 3 = 1.	:		
2.3	Execute command: COOLER DOOR ELECTROMAGNET OFF/ FRAME DC RESTORE SELECT.	15		(/)
2.4	Verify via the CTT that digital Word C bit 3 = 0			(√)
3.	Break Release.			
	Execute command: COOLER DOOR MOTOR OFF.	53		(J)
3.1	Terify via the CRT that digital .			

TEST ENGINEER	DATE 25 (- QA TI)
E.M. MODULE UNIT TEST	A 11323 16704
	SCALE 2EV C SHEET]

DATA SHEET NO. 2 OF 11

PARAGRAPH NO. 4.17

ORIGINAL PAGE IS DETAILED FUNCTIONAL TESTS

OF POOR QUALITY

PARA OR STEP PROCEDURE STEP SPEC RECORD OR DATUM.	
NO. COMMAND VERIFY	
3.1 - Word C bit 4 = 0.	- ()
Connect a DVM across the Cooler Door Brake TP's on the Function Test Panel, observing the proper polarities.	
3.3 Execute commands:	
COOLER DOOR MOTOR ON. COOLER DOOR MOVE INHIBIT. COOLER DOOR MOVE. 52 88 87	- (5)
3.4 Verify via the CRT that digital Word I bit 4 = 1. C bit 4 = 1.	- {
Verify that the DVM is measuring 33 (=3.0) VDC.	volts
3.5 Execute command:	
COOLER DOOR MOTOR OFF. 53	· ((/ う) i
COOLER DOOR MOVE INHIBIT. 88	(1)
4. Cooler Door Switches	
4.1 Door Closed. Set the cooler door switches on the Function Test Panel as follows:	
"open" - down. down	(~)
"closed" - up (grounded). up	(1)
"outgas" - down. down	(1)
4.2 Execute command:	
COOLER DOOR MOTOR ON. 52	(V)
4.3 Verify via the CRT that digital	
Word C bit 0 = 1	(1)
bit 1 = 0	(1)

TEST ENGINEER		DATE ZZZ/t	<u>QA</u> 72,
E.M. MODULE UNIT TEST	SIZE	11323	16704
	SCALE	SEA .	SHEET 3
SCHOOL SEE DISTERICH POST CLEARPRINE COOK	À		

DATA SHEET NO. 3 OF 11

PROCEDURE STEP

bit 2 = 0

bit 4 = 1.

PARAGRAPH NO. 4.17

ORIGINAL PAGE IS OF POOR QUALITY

PARA OR STEP

NO

.4.3)

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 5800 SPEC RECORD UNITS OR DATUM / COMMAND VERIFY

4.4	Outgas position. Set the cooler door switches on the Function Test Panel as follows:			
	"open" - down.			(V)
	"closed" - down.			(4)
4.5	"outgas" - up (grounded). Execute command: COOLER DOOR MOTOR ON. Verify via the CRT that digital	52		(3)
	Word C bit 0 = 0			(,
	bit 1 = 1			(V)
	bit 2 = 0			(V)
	bit 4 = 1.			(1)
4.6	Full open. Set the cooler door switches on the Function Test Panel as follows:	٠		
	"open" - up (grounded).			(~)
	"closed" - down.			(~)
4.7	"outgas" - down. Execute command: COOLER DOOR MOTOR ON. Verify via the CRT that digital	5 2	7	(7)
	Word C bit 0 = 0			(v)
	bit 1 = 0		_v_	(×)
	bit 2 = 1		<u> </u>	(~)
				• • •

TEST ENGINEER ENTER		DATE 3/	-/4-	_ QA _	(1)
E.M. MODULE UNIT TEST	SIZE	11323	NUMBER	16704	
)	SCALE	254		SHEET -	

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DATA SHEET NO. 4 OF 11

PARAGRAPH NO. 4.17

111

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 5800 PARA SPEC RECORD OR PROCEDURE STEP OR DATUM / UNITS STEP COMMAND VERIFY (4.7)(V) bit 4 = 1. 4.8 Reset. Set all switches down. Execute command: **(/**) COOLER DOOR MOTOR OFF. 53 Verify via the CRT that digital (/) Word C bit 0 = 0ORIGINAL PAGE IS OF POOR QUALITY bit 1 = 0(V) (V) tit 2 = 0 b1t 4 = 0.(V) Motor Test Connect an oscilloscope to Door Motor Phase 1, No. 1 (+) TP and Door Motor Phase 2, No. 1 (+) TP on the Function (Test Panel. . 5.1 Door Opening. Execute commands: COOLER DOOR MOTOR ON. (1) 52 COOLER DOOR OPEN. (V) 85 (سنر COOLER DOOR MOVE INHIBIT. 88 (V) **87** COOLER DOOR MOVE

TEST	ENGINEER		furini_		DATE 3/2	T/r	_ QA _	(72)
E. M.	MODULE	UNIT	TEST	Size	11323	NUMBER	16704	
				SCALE	2 E V	<u>.</u>	SHEET	

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DATA SHEET NO. ____ OF ___ PARAGRAPH NO. _4.17

DETAILED FUNCTIONAL TESTS

1 OG AHR OPER 5分

<i>8</i>		LUG A	HK OPER	7 3600
PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	
(3.1)	Observe the phase 2 test point shifted 90° with respect to the phase 1 test point. Photograph the waveform and attach it below:	PRIGINAL PAGE PF POOR QUALI	is	(\$
	ZOV 50075		Y	
5.2	Verify via the CRT that digital Word C bit 4 = 1 Word I bit 4 = 1 bit 5 = 1.			5 5 5

TEST ENGINEER JEWYON	DATE 2/21/12 CA
E.M. MODULE UNIT TEST	A 11323 16704
	SCALE I REA SHEET

DATA SHEET NO. 6 OF 11 PARAGRAPH NO. 4.17

DETAILED FUNCTIONAL TESTS

[LUG A	HR OPE	7 200
	PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
	5.3	Door Closing.			
		Execute commands:			
		COOLER DOOR MOTOR ON. COOLER DOOR CLOSE. COOLER DOOR MOVE INHIBIT. COOLER DOOR MOVE.	52 86 88 87	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	\$303
	5.4	Observe the phase 2 test point shifted 270° with respect to the phase 1 test point.		V	(~)
		Photograph the waveform and attach it below:	-		
1					
		200	i i	PAGE IS QUALITY	
-					

TEST ENGINEER	·	DATE 2/21/12	CV Z. Z.	
E.M. MODULE UNIT TEST	A	11323	16704	;
	; SC VLE	` # E +	\SHE!*	
	Δ			

DATA SHEET NO. 7 OF 11

PARAGRAPH NO. 4.17

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 5100 PARA **SPEC** RECORD PROCEDURE STEP OR DATUM / UNITS COMMAND **VERIFY** 6 3.3 Verify via the CRT that digital (V) Word C bit 4 = 1 ORIGINAL PAGE IS OF POOR QUALITY Word I bit 4 = 1 **(レ)** bit 5 - 0. (-) 5.5 Connect the oscilloscope to Door Motor Phase 1, No. (+) TP and Door Motor Phase 1. No. (-) TP. 50(±12) 60 Differentially measure voltage, V_{p-p} 400(±12) 400 Ηz frequency. (Note: since the door motor output is a clocked signal it may be necessary to reissue cooler door Move Enable command 88/ 87 periodically. Do so as needed.) Photograph waveform and attach below:

TLUT ENGINEER / LUYTON	DATE RICKY CA	
E.M. MODULE UNIT TEST	A 11323 16704	
	SCALE 'PEV SHEE"	
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DATA SHEET NO. 8 OF 11

PARAGRAPH NO. 4.17

DETAILED FUNCTIONAL TESTS

LOGAHR OPER 500

<u> </u>		LUG A	TR OPER	7500
PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
5.7	Connect an oscilloscope to test points J20-44 "Phase 1, No. 1 Test" and J20-45 "Phase 1, No. 2 Test." Issuing command 88/87 as needed, verify that each test point produces a 30V p.p squarewave output	. 30(<u>+</u> 6)	<u>/</u> _/31	(√) Vp-p
5.8	Repeat 4.17.5.6 above for Door Motor Phase 2 outputs.			
	voltage	50(±12)	60	Vp-p
!	frequency	400(±12)	<u></u>	Ηz
	Photograph: ORIGINAL PAGE IS OF POOR QUALITY			
	Zev Zeons	•	•	

TOUT ENGINEER / LUYTON	D	ATE 2/21/	<u>fu-</u> CA	
E.M. MODULE UNIT TEST	A C	11323	16704	
	SCALE	3 € 4	Smil.	
1	A			

DATA SHEET NO. 0 OF 11 PARAGRAPH NO. 4.17

DETAILED FUNCTIONAL TESTS

1			LOG A	HR OPE	7500
	PARA OR P STEP STEP	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
	5.9	Connect an oscilloscope to test points J20-46 "Phase 2, No. 1 Test" and J20-47 "Phase 2, No. 2 Test." Issuing command 88 87 as needed, verify that each test point produces a 30/p-p squarewave output.	7 30± 6	<u>,</u> _3/	(/) Vp-p
1	6.1	Cated Clock Test Execute command:			
		COOLER DOOR MOVE INHIBIT.	8 8		()
		Verify via the CRT that digital ORIGINAL F OF POOR Q Word I bit 4 = 0.	AGE IS UALI TY		(J)
-	6.2	Connect the oscilloscope across the Door Motor Phase 2 Outputs and set it for a slow sweep Rate.			w
		Execute command:			
' 		COOLER DOOR MOVE	<i>1</i> 87	<u></u>	(15)
Ì	6.3	Verify that the door motor output waveform appears for $15(\pm 2)$ seconds.	15(±2)	14	sec.
!		Connect another oscilloscope to test point J20-48 "3.2 kHz Clock Test."			(1)
1		Execute command 38/87 and verify a 3.2 kHz TTL signal on J20-48.	3.2 <u>+</u> (0.2	3.1	kH z
		Verify via the CRT that dig tal			
		Word I bit 4 = 1.			(~)
l	6.4	Set the Cooler Door Switch "Closed" in the up (grounded) position.			5
_		Execute commands 88/87.	SE / 37		(🗸)

TLIT ENGINEER LEVY TOU		DATE 2/94/		
E.M. MODULE UNIT TEST	SIZE	11323	16704	
	SCALE	i stv	SHEET	

DATA SHEET NO. 10 OF 11 PARAGRAPH NO. 4.17

DETAILED FUNCTIONAL TESTS

1.06	AHR	OPER	2800
1 ()()	AUL	VEER	

		LOG A	HK OPE	720
PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(6.4)	URIGINAL PAGE IS OF POOR QUALITY			()
6.5	COOLER DOOR MOVE INHIBIT.	88 87		(<i>-</i>)
	Verify that the door motor output waveform appears across the Phase 2 outputs for 0.5(-0.2) seconds.		-6	sec.
7.	Reset.		,	
7 - 1	Set all switches down.			(n).
, ,	Execute commands:			
	COOLER DOOR MOVE INHIBIT.	88		(1)
:	COOLER DOOR MOTOR OFF.	53		(1)
7.3	Verify via the CRT that digital			
	. Word C bit O = O			(1)
	bit 1 = 0			(1/)
	bit 2 = 0			(')
	bit 3 = 0			(V)
	bit 4 = 0			(~)
	Word I bit 4 = 0.			(V)

	ENGINEER	1/-1	14 ToN		DATE	2/	24/8-	_ QA	
	MODULE			SIZE	1132	23	NUMBER	16704	
L				SCALE		2€ √		SHEET : 1	

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ORIGINAL PAGE IS OF POOR QUALITY

		CMD	
Word/Bit	Function	<u>On</u>	<u>Off</u>
c/0	Cooler Doc · Closed	N/A	N/A
C/1	Cooler Door Outgas Position	N/A	N/A
C/2	Cooler Door Full Open	N/A .	N/A
c/3	Cooler Door Magnet On	1 E	1 F
C/4	Cooler Door Motor On	52	53
I/4	Cooler Door Move Enable/Inhibit	87	88
1/5	Cooler Door Open	85*	86†

^{*} Door is Opening

Table 4.17

5125	CODE DENT NO	~L ~6E?
A	11323	16704
SCALE	3E+ '	ismes* 17:

TERM NO VILLA O SE O STOR DA POST DESERRAN DESA

[†] Door is Closing

DATA SHEET NO. ___ OF __ PARAGRAPH NO. 4.18

DETAILED FUNCTIONAL TESTS

L		LOGA	HR OPER	7 3707
PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	
(4.18)	LVDT POWER CONTROL Confirm that test cable 46 is connected			
2.	properly between the Electronics Module and the Function Test Panel (FTP). LVDT Power Check. CRIGINAL P	AGE IS		(1)
2.1	Execute command: OF POOR C LVDT POWER OFF. LVDT POWER ON	UALITY 5E 5B	<u>~</u>	(2)
2.2	Verify via the CRT that digital Word E bit 1 = 1. Connect a DVM between LVDT Power 1 TP and			(~)
	LVDT Return TP on the FTP. Confirm that the DVM measures +15(±0.3)VDC	.14.7 ≤V≤15.3	<u>/5.0</u>	(V) VDC
2.4	Connect a DVM between LVDT Power 2 TP and LVDT Return TP on FTP. Confirm that the DVM measures +15(±0.3)VDC	. 14.7 ≤V≤15.3	<u>/5,0</u>	(~) VDC
2.5	Connect a DVM between LVDT Power 3 TP and LVDT Return TP on FTP Confirm that the DVM measures +15(±0.3)VDC	14.7 ≤ v <15.3	15.0	(~)
2.6	Execute command: LVDT POWER OFF.	5E	V	(v)
2.7	Verify via the CRT that digital Word E bit l = 0.		<u></u>	(/)

.Tc5T	ENGINEER	LUYTON	,,	DATE 2/	26/82	QA	·
E. M.	MODULE	UNIT TEST	Size	11323	NUMBER	16704	
) ·			SCALE	954	`.	SHEET _	

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DATA SHEET NO. 2 OF 3 PARAGRAPH NO. 4.18

CRIGINAL PAGE IS DETAILED FUNCTIONAL TESTS

	ORIGIN OF PO	OOR-QUALITY	LOG AHR OPER 5000			
	PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS	
r	2.8	Repeat supparagraphs 2.3 to 2.5 and confirm the following DVM measurement:				
		2.3: 0(±0.1)VDC	-0.1≤V≤0.1	<u>-/-</u>	VDC	
		2.4: 0(±0.1) VDC	-0.1≤V≤0.1	<u></u>	VDC	
7.		2.5: 0(±0.1) VDC	-0.1<7<0.1	<u></u>	VDC	
	3.	LVDT #1 Output Buffer Check.				
	3.1	Execute command:				
1		LVDT POWER ON	5B		(Z)	
ļ	3.2	Verify via the CRT that digital				
Ì		Word E bit 1 = 1.			(<)	
	`3	Connect the Power Design 2005 voltage reference between LVDT Output 1 TP and LVDT Return	,		(V)	
	3.4	Request analog telemetry Channel 56 "Inchworm 1 position" on CRT.		1	(r)	
!	3.5	With voltage reference adjusted for -1.50(±0.20)VDC input, verify that analog telemetry channel 56 output reads 0.20(±0.40)VDC.	-0.20≤V≤0.60	.08	VDC	
t	3.6	With voltage reference adjusted for 0.00(±0.20)VDC input, verify that channel 56 output reads 2.50(±0.40)VDC.	2.10≤V≤2.90	2.5(_	VDC	
	3.7	With voltage reference adjusted for 1.50(±0.20)VDC input verify that channel 56 output reads 5.00(±0.40)VDC.	4.60≤V≤5.40	4.96	VDC	

77	ENGINEER	1/nyTax		DATE 2/20	/r CA	
E. M.	MODULE	UNIT TEST	SIZE A	11323	16704	1
			SCALE	861	SHEET	3

DATA SHEET NO. 3 OF 3 PARAGRAPH NO. 4.18

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OF POOR QUALITY DETAILED FUNCTIONAL TESTS

	·	LOG A	HR OPE	75800
PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
0	LYDT #2 Output Buffer Check.			1
4.1	Reset voltage reference to 0.0(±0.20)VDC, remove it from LVDT Output 1 TP, and connect it to LVDT Gitput 2 TP.		· 	(/)
4.2	Request analog telemetry Channel 57 "Inchworm 2 position" on CRT.			(V)
4.3	Repeat subparagraphs 3.5 to 3.7 and verify that Channel 57 outputs read as follows		,	
i È	3.5: 0.20(±0.40)VDC	-0.20≤⊽≤0.60	80.	VDC
	3.6: 2.50(±0.40) VDC	2.10≤₹42.90	2.56	VDC
<u> </u>	3.7: 5.00(±0.40)VDC.	4.60≤V≤5.40	5.1	VDC
-	LVDT #3 Output Buffer Check.	-		1
5.1	Reset voltage reference to 0.0(±0.20)VDC, remove it from LVDT Output 2 TP, and connect it to LVDT Output 3 TP.			(√)
5.2	Request analog telemetry Channel 58 "Inchworm 3 position" on CRT.			(√)
5.3	Repeat subparagraphs 3.5 to 3.7 and verify that Channel 58 outputs read as follows	!		
;	3.5: 0.20(±0.40) VDC	-0.20≤₹≤0.60	.08	VDC
	3.6: 2.50(±0.40) VDC	2.10≤v≰2.90	2.62	VDC
	3.7: 5.00(±0.40) VDC.	4.60≤v≰5.40	4.96	VDC
6.	Reset.			,
6.1	Execute command: LVDT POWER OFF	5 E		(4)
6.2	Verify via the CRT that digital Word E bit 1 = 0.	•	~	(√)

	ENGINEER	1/4	470p		DATE 2/20	/fr	. QA _	<u> </u>
 E. M.	MODULE	UNIT	TEST	A	11323	NUMBER	16704	
				SCALE	1 264		SHEE* -	

Appendix E

Electronics Module Performance Test

Part 3

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Post-Vibration Test Data

DATA SHEET NO. 1 OF 12 PARAGRAPH NO. 4.2

DETAILED FUNCTIONAL TESTS

	<i>5</i> 2.7.22 <i>5</i> . 6	HOTIONAL		HR OPE	700
PARA OR STEP NO.	PROCEDURE STE	p		RECORD DATUM /	
(4.2)	CDVU TEST Auxiliary Circuits (A22) Test				
1.1	Install Board A22 (Aux Circuit 52798)on a card extender.	s Board -			(V)
1.2	Turn on power. Turn on multi; multiplexer simulator.	olexer/			S
	•				
1.3	Using an oscilloscope, verify of the following output signal specified pins (refer to Table details):	s on the			
1	Signal	Pins			
+	208.1 kHz SLC Delay Clk (PRI)	177,178	Table 4.2A		(~)
	208.1 kHz SLC Delay Clk (PRI)	179,180	Table 4.2A		(~)
	104 kHz Sync. (PRI)	169,170	Table 4.2A		(~)
	208.1 kHz SLC Delay Clk (Rdt)	175,176	Table 4.2A		(~)
	208.1 kHz SLC Delay Clk (Rdt)	173,174	Table 4.2A		(~)
į	104 kHz Sync. (Rdt)	83,84	Table 4.2A		(v [*])
	Buffered Line Stop	77,78	Table 4.2A		(~)
	Buffered Line Stop	75,76	Table 4.2A		(~)
	End of Scan	79,80	Table 4.2A		(r)
	End of Scan	81,82	Table 4.2A		(5)
1.4	Turn power off. Turn off multiplexer simulator. Take A22 off extender car install directly in its connector.				(~)

	. ¿ST	ENGINEER	J bong	3		DATE 136	2141	QA <u>(%)</u>
	E. M.	MODULE	UNIT	TEST	Size	11323	NUMBER	16704
ĺ					SCALE	SEV	٤ -	SHEET 27

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ď:

Table 4.2A

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A22 Test Matrix

	Will Allman	122 TVD11M		OLUMBIA.	
STEP		A22 INPUT PINS(REF.)	A22 OUTPUT	OUTPUT TYPE* SIGNAL	VERIFY
1	P09-D3	A22-151,152	177,178	208.1 kHz Clk (2a) Frequency 208.1 (±4 2 kHz); duty cycle 20 (= 17) %	V
2	P09-D4	-67,68	179,180	208.1 kHz Clk (2b) Increase of above step 1 tmg	v
3		•	169,170	104 kHz Sync (1) Freq. 104 (±2.1)kHz; duty cycle 40(±8)%	/
4	P09-A1	A22-171,172	175,176	208.1 kHz Dly Clk (2a) Same as above Step 1 timing	-
5	P09-A2	-73,74	173,174	208.1 kHz Dly Clk (2b) Same as above Step 2 timing	V
6			83,84	104 kHz Sync Rdt (1) Same as above Step 3 timing	V
7	P09-A5	A22-69,70	77,78	Surfered line Stop (2a) 9.01 (±1.0) us pulse; period 7/.3 (+2.0) us	1
8	P09-85	-71,72	75,76	Buffered Line Stop (2b) Inverse of above Step 7 wavin	1
9			79,80	End of Scan (2a) Same as above Step 7 waveform	V
10			81,82	End of Scan (2b) Inverse of above Step 9 waveform	٧

* Type 1. TTL Compatible

Type 2. Line Receiver Compatible

Logic "1" +2.4 to +5.5V

Logic "0" -1.0 to +1.5V

Logic "1"
2a > AND: 2.4 ro 5.0V

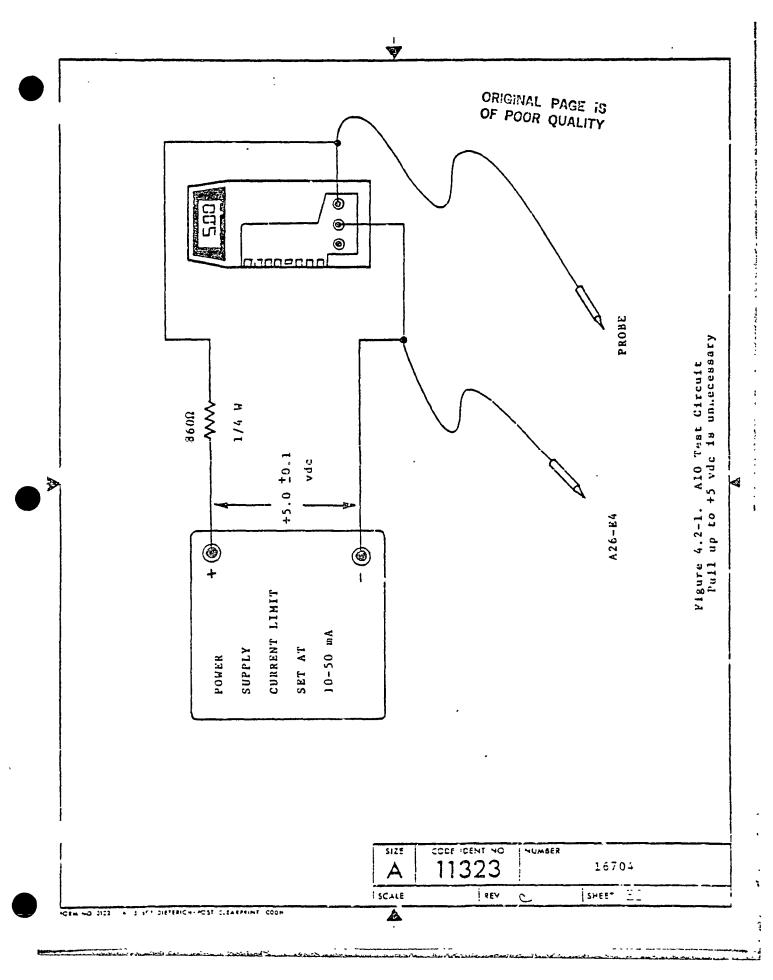
NAND: 0.0 to 0.4V

(Logic "0"

2b \$NAND: 0.0 to 0.47

AND: 2.4 to 5.0V

SiZE		NUMBER	
A	11323		16704
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	DATA CLIFET NO 2 OF 12		NO 4 2	
	DATA SHEET NO. 2 OF 13	-ARAGRAFI	140.	-
	DETAILED FUNCTIONAL		HR OPER	R <u>700</u>
PARA OR STEP NO.	PROCEDURE STEP		RECORD DATUM / VERIFY	
2.	Serial Magnitude Board (AlO) Test			
2.1	With power off, install board AlO (Serial Magnitude Command Receiver/Decoder Board - 50901) on an extender cara.			(/)
	Install board All (Verification Register Unit - 50949) in its connector.			(1)
	Turn on power.			(V)
2.2	Execute command: .SERIAL COMMAND RECEIVER 2 ON/1 OFF.	34		(1)
2.3	Verify via the CRT that digital			
	Word A bit 4 = 0.			(1)
4	Execute command:			
	SERIAL COMMAND RECEIVER 1 ON/2 OFF.	33		(
2.5	Verify via the CRT that digital			
	Word A bit 4 = 1.		<u> </u>	(/)
2. 6	Issue commands as indicated in the second column of data sheet 4.2.2A. After each command is issued, use the test circuit in Figure 4.2-1 (or equivalent) to verify the output signal bit/state status at the points indicated on AlO. (The status of test points is determined as follows):			
	Logic "1" - +2.4 to +5.5 VDC			
	Logic "0" = +1.0 to +1.5 VDC)			
	•			
_ EST E	ENGINEER Lay DATE	432 'F1	_ QA _	<u> </u>

16704 E.M. MODULE UNIT TEST SCALE SHEET

DATA SHEET 4.2.2A

ORIGINAL PAGE IS OF POOR QUALITY

A10 TEST MATRIX

TEST STEP	CMD (EEX)	AlO OUT- PUT BIT/ STATE	OUTPUT SIGNAL CARD/PIN(S)	OUTPUT SIGNAL DESTINATION (REF ONLY)	TLMY WORD/ BIT	VERIFY OUTPUT	VERIFY TLMY
2	94	7/1	A10 - 5,	A3 - 25,	J/6=0	V	V
2	93	7/0	ó	26	=1	V	V.
3	92	8/1	A10 - 95,	A3 - 111,	J/7=0	V	~
4	91	8/0	96	112	<u>=</u> 1	V	V
5	90	9/1	A10 - 167,	A3 - 107,	1/0=0	V	~
5	8F	9 /O	168	108	=1		~
7	3E	19/1	AlO - 77,	A3 - 93,	I/1=0	V	~
8	30	19/9	78	94	# 1	~	4
9	3 C	11/1	A10 - 83,	A3 - 11,	1/2=)	V	V
10	ŝВ	11/0	84	12	=1	V	<i>-</i>
11	SA	12/1	A10 - 173,	A3 - 13,	I/3=0	V	~
12	39	12/0	174	14	=1	V	v
13	. 88	13/1	A10 - 71,	A9 - 31,	I/4=0	~	~
14	3.7	13/0	72	32	<u>1</u>	~	~
15	3 5	14/1	A10 - 161,	A9 - 21,	1/5=0	~	
16	8.5	14/0	162	22	=1	V	~
17	34	15/0	A10 - 163,	MUX J13-A1	I/5≈0	~	~
13	63	15/1	164	A2	-1	V	~
19	3.2	15/0	A10 - 73,	MUK J13-A3	1/2=0	~	V
20	51	16/1	74	A-	=1	V	

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	DATA SHEET NO3 OF F	PARAGRAPH	NO. <u>4.2</u>	
! 	DETAILED FUNCTIONAL		HR OPER	700
PARA OR STEP NO.	PROCEDURE STEP		RECORD DATUM/	
2.7	After each command is issued in 4.2.2.7, telemetry Words I and J shall be monitored. Yerify that these status words reflect the "bit/state" status of Column 3 of Data Sheet 4.2.2A.			
3.	Macro Discrete No. 2 Command Generator (A14)			
3.1	With power off, <u>install</u> board Al4 (Macro Discrete No. 2 Command Generator - 51814).		<u></u>	(1)
Artificial de la constante de	Install extender cards in connectors Al2 and Al3.			(~)
	Turn power on.	,		(~)
.2	Execute command:			
	MACRODISCRETE COMMAND GENERATOR OFF.	39		()
	Verify via the CRT that digital			
	Word F bit 2 = 0			(1
İ	bir 3 = 0			<->
	bit 4 = 0			(~)
	bit 5 = 0.			()
3.3	With an escillescope, menitor power-on voltage at Al2, pins 81, 82.		<u></u>	(1)
	Execute command:			
	MACRODISCRETE COMMAND GENERATOR A PRIMARY ON/A REDUNDANT OFF.	35		(1
		•		
. EST	ENGINEER DATE	4 2= 181	_ QA _	
	MODULE UNIT TEST A 1132		16704	
	SCALE .	1 2EV	SMEE"	
ICLM NG : III	Control of the second control of the second			

DATA SHEET NO. 4 OF 12 PARAGRAPH NO. 4.2

DETAILED FUNCTIONAL TESTS

	DETAILED FONCTIONAL	LOG A	HR OPE	700
PARA OR STEP NO.	PROCEDURE STEP		RECORD DATUM/	
(3.3)	Verify an initial TTL high voltage (power on reset) at Al2 pins 81, 82.			(N)
3.4	Verify via the CRT that digital			
	Word F bit 2 = 1			(V)
	bit 3 = 0 OF PO	AL PAGE IS		(1)
	bit 4 = 0	(0),())		S
	bit 5 = 0.			(V)
3.5	Repeat 4.2.3.2. (CMD 39)			
3.6	With a DVM, monitor power-on voltage at Al2, pins 17, 18.			(~)
•	Execute command:			
	MACRODISCRETE COMMAND GENERATOR A REDUNDANT ON/A PRIMARY OFF.	36		(1)
	Verify an initial TTL high voltage (poweron reset) at Al2, pins 17, 18.	•		(~)
3.7	Verify via the CRT that digital			
	Word F bit 2 = 0		_ <u></u>	()
	bit 3 = 1			(~)
	bit 4 = 0			(~)
	bit 5 = 0.			(1)
3.8	Repeat 4.2.3.2 (CMD 39)			
		<u> </u>		

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	MODULE			Size	11323	NUMBER	16704	
				SCALE) SEA	C	SHEET ==	

DATA SHEET NO. 5 OF 12

PARAGRAPH NO. 4.2

DETAILED FUNCTIONAL TESTS

		LOG A	HR OPE	700
PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	
3.9	With a DVM, monitor power-on voltage at Al3, pins 81, 82.			(V)
	Execute command:			
	MACRODISCRETE COMMAND GENERATOR B PRIMARY ON/B REDUNDANT OFF.	37	<u></u>	(~)
	Verify an initial TTL high voltage (power on reset) at Al3, pins 81, 82.			()
3.10	Verify via the CRT that digital			
	Word F bit 2 = 0			(1)
	b1t 3 = 0			(~)
	bit 4 = 1			(س)
	b1t 5 = 0.			(/)
3.11	Repeat 4.2.3.2. (CMD 39)			(m)
3.12	With a DVM, monitor power-on voltage at Al3, pins 17, 18.			(V)
	Execute command:			
	MACRODISCRETE COMMAND GENERATOR B REDUNDANT ON/B PRIMARY OFF.	38		(~)
	Verify an initial TTL high voltage (power- on reset) at Al3, pins 17, 18.			(1)
3.13	Verify via the CRT that digital			
	Word F bit 2 = 0			(r)
	bit 3 = 0			(/)
			1	
IST 8	ENGINEER Jayo DATE	4 DEZ'81	_ QA _	
E. M.	MODULE UNIT TEST A 113		16704	

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DATA SHEET NO. 4 OF 13

PARAGRAPH NO. 4.2

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 700 PARA OR STEP SPEC RECORD UNITS PROCEDURE STEP OR DATUM / COMMAND VERIFY (3.13)bit 4 = 0(1) CRIGINAL PAGE IS OF POOR QUALITY (5) bit 5 = 1. Repeat 4.2.3.2. (CMD 39) (/) 3.14 4. Macro Discrete Command Generator No. 1 Ch. 1 (A12) With power off, install board Al2 (Macro Discrete Command Generator No. 1 - 51796) 4.1 () on extender card. Folos (1) Turn power on. 4.2 Execute command: MACRODISCRETE COMMAND GENERATOR A PRIMARY ON/A REDUNDANT OFF. 35 (~ 4.3 Connect breakout boxes and cable 46 to (1) J46 on the Electronics Module. (1) Connect a DVM across test points (1) J46-M3 (+) and J46-M4 (-).

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E.M. MODULE UNIT TEST	SIZE CODE GENT NO NUMBER 16704	
	SCALE REY SHEET	

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		ORIGINAL PAG OF POOR QUA		
	DATA SHEET NO. 7 OF 10	PARAGRAPH	NO4.2	_
	DETAILED FUNCTIONAL		HR OPEF	7 <u>00</u>
RA P	PROCEDURE STEP	SPEC OR	RECORD DATUM/	
	Execute command:			
	INCHWORM POWER ON.	4 F		(i)
	Verify that +30 ± 2VDC appears between J46-M3 and J46-M4.	+30 ± 2	31.0	Volts
	Execute command:	-		
	INCHWORM POWER OFF.		<u>_v</u>	
	Verify that the voltage between $J46-M3$ and $J46-M4$ returns to 0.0 \pm .1VDC.	LOG AHR OPER_ SPEC RECORD DATUM / VERIFY 4F	volts	
	, <u>, , , , , , , , , , , , , , , , , , </u>			
				ļ
				1
į	Execute command:	,		
į	MACRODISCRETE COMMAND GENERATOR OFF.	30	V	(4
				(-)
		<u> </u>		

EST ENGINEER Jong QA CODE IDENT NO 16704 11323 E.M. MODULE UNIT TEST A SCALE REV SHEET ...

TORM NO 3 12 A 3 481 DIRTERICH POST CLEARPRINT GOOM

4.4

4.5

8 OF POOR QUALITY DATA SHEET NO. _ 8 OF _ ... PARAGRAPH NO. 4.2 DETAILED FUNCTIONAL TESTS LOGATH OPER 700 PARA OR STEP SPEC RECORD PROCEDURE STEP **UNITS** OR / MUTAD **VERIFY** COMMAND NŌ ۲ 5. Macro Discrete Command Generator No.1 Ch.2 With power off, install board Al3 (Macro Discrete Command Generator No. 1 - 51796) 5.1 (1) on extender card. i, (1) Turn power on. 5.2 Execute command: MACRODISCRETE COMMAND GENERATOR B 1 PRIMARY ON/B REDUNDANT OFF. (1) 37 5.3 Install an extender card in position A08. 5.4 Use an oscilloscope to monitor the voltage between A08 pin 165 (+) and A08 pin 61 (-1) with 20 km resistor between oscilloscope propes. (W Execute command: COOLER DOOR FUSIBLE LINK SWITCH A CLOSE 5 & Verify that a +28V pulse, minimum 30 millisecond pulse width, appears across A08 pin 165 and pin 61. Use an oscilloscope to monitor the voltage 5.5 between A08 pin 165 (+) and A08 pin 157 (-) (1 with ZOKA resistor between oscilloscope probes. Execute command: FUSIBLE LINK SWITCHES OPEN. 600 (i) 420 1/1 IST ENGINEER DATE QA CODE IDENT NO SIZE NUMBER 16704 11323 E.M. MODULE UNIT TEST Α

SCALE A

CEM NO 3173 A 2 69 DIETERICH FOST CLEARPRINE COOR

REV

SHEET -

	<u> </u>			
	DATA SHEET NO. 9 OF 13	PARAGRAPH	NO. 4.2	_
	DETAILED FUNCTIONAL			
	,	LOG A	HR OPE	700
PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(5.5)	Verify that a +28V pulse, minimum 30 milliseconds pulse width, appears across A08 pins 165 and 157.			(1)
5.6	Execute command:			
	MACRODISCRETE COMMAND GENERATOR OFF.	. 3 è		(5
6.0	Redundant Command Circuitry			
6.1	Attach the cables from the Telemetry/ Command Interconnection Box receptacles TJ9,TJ9A: TJ10,TJ10A; TJ11,TJ11A; TJ16, TJ16A; to J12, J13, J15 and J17("Redundant RIU Connectors") on the Electronics			(/)
· .	Module.			(🕶)
6.2	Execute command:			
	SERIAL COMMAND RECEIVER 2 ON/1 OFF.	34		(~)
	Verify via the CRT that Jigital			
	Word A bit 4 = 0.			(-)
6.3	Perform the tests specified in Table 4.2-3, issuing the commands specified and verifying via the CRT the telemetry responses indicated. Where the telemetry			
	state is unspecified verify that the microprocessor in the test set received the expected command Echo. Use "V" command mode (see para 3.3.8.1).			(/)
. EST	ENGINEER DATE	12/5/21	_ QA _	
	MODULE UNIT TEST A 113		16704	
	SCALE	REV 2	SHEET 38	
FORM NO 3122 1	A C 481 DISTESION POST CLEARPRINT COON			

Table 4.2-3

REDUNDANCY TEST MATRIX

TEST	CMD	TLMY	VERIFY
STEP	(HEX)	WORD/BIT/STATE	TLMY
1	94	J/6 = 0	,
l			
2	93	J/6 = 1	/
3	92	J/7 = 0	/
4	91	J/7 = 1	
5	90	1/0 = 0	
6	8 F	1/0 = 1	~
7	8E	I/1 = 0	/
8	8 D	I/1 = 1	/
9	8 C	I/2 = 0	
10	8 B	I/2 = 1	
11	8 A	I/3 = 0	/
12	89	1/3 = 1	~
13	88	I/4 = 0	/
14	87	I/4 = 1	<i>\(\omega\)</i>
15	86	I/5 = 0	~
16	85	I/5 = 1	
17	84	I/6 = 0	
18	83	I/6 = 1	/
19	82	I/7 = 0	~
20	81	I/7 = 1	/
21	25	B/O = N/A	/
22	5A	C/5 = N/A	

Fanach 12/5'8'

SIZE	CODE IDENT NO.	NUMBER		
A	11323		16704	
SCALE	1564	2	SHEET	-

Table 4.2-3 (Continued)

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REDUNDANCY TEST MATRIX

TEST STEP	CMD (HEX)	TLMY WORD/BIT/STATE	VERIFY TLMY
23	12	D/2 = N/A	/
24	58	E/1 = N/A	/
2.5	35	F/2 = 1	/
26	36	F/3 = 1	/
2 7	37	F/4 = 1	/
28	38	F/5 = 1	/
29	39	F/2,3,4,5 = 0	
30	4B	G/1 = N/A	
31	18	H/6 = N/A	/
32	7	L/2 = N/A	/

Barach 12/5/81

SIZE	CODE IDENT NO.	NUMBER	
Α	11323		16704
SCALE	i sev	C	SHEET

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		IV.		U 1.	

PARAGRAPH NO. 4.2

DETAILED FUNCTIONAL TESTS

L			LOG A	HR OPE	₹ 700
	PARA OR STEP NO.	PROCEDURE STEP		RECORD DATUM/	
	6.4	Before continuing to any further tests return the cabling between the Electronics Module and the Telemetry/Command Interconnection Box to its Primary Configuration. (prior to 4.2.6.1).			-
	6.5	Execute commands:		,	
		SERIAL COMMAND RECEIVER 1 ON/2 OFF	33		()
		MACRODISCRETE COMMAND GENERATOR A PRIMARY ON/A REDUNDANT OFF	35		()
		MACRODISCRETE COMMAND GENERATOR B PRIMARY ON/B REDUNDANT OFF	37		()
İ		Verify via the CRT that digital			
		Word A bit 4 = 1 Word F bit 5 = 0 4 = 1 2 = 1 3 = 0		/	() () ()
		original page 18 of poor quality			
I				I	1 '

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E.M.	MODULE	UNIT	TEST	SIZE	11323	MUMBER	16704	
				SCALE	164	٥	SHEET	
108m =0 2122	" A 3 est Sieterich 40:	ST C.EARPRINE C	06 M	A				

DATA SHEET NO. 1 OF 3

PARAGRAPH NO. 4.11

DETAILED FUNCTIONAL TESTS

		LOG A	HR OPE	R_ <i>700</i>
PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	
(4.11)	Note: In Order To Perform This Test Boards A01 & A02(52250-1, 52250 -2) Must Be Installed. SCAN LINE CORRECTOR TEST	·		
1.	Confirm that test cable 44 is connected properly between the Electronics Module and the Function Test Panel.			(J)
	Connect test cable 20 and its breakout box to J20 on the Electronics Module.	-		رکی
2.	SLC #1 On/SLC #2 Off			
2 171	Execute commands:			
	SCAN LINE CORRECTORS OFF.	4 C		(√)
i	SCAN LINE CORRECTOR 1 ON/2 OFF.	4 A		(√)
2.2	Verify via the CRT that digital			,
	Word G bit 0 = 1			(√)
	bit 1 = 0.			C/ 1
2.3	Verify via the CRT that analog telemetry			
	Channel 44 "SLC 1 Drive Current" is 2.5 ± 2.5V.*	2.5 ± 2.5*	3.26	volts
	Channel 46 "SLC 1 = 15V" is 2.5 ± 0.3V.	2.5 ± 0.3	2.52	volts
	Channel 47 "SLC 1 + 5V" 1s 2.5 ± 0.1V.	2.5 ± 0.1	2.52	volts
	* Waveform is a sawtooth shown in Figure 4115.			

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E.M. MODULE UNIT TEST	SIZE	11323	16704
	SCALE	REV C	SHEET F

DATA SHEET NO. 2 OF 3

PARAGRAPH NO. 4.11

. .	DETAILED FUNCTIONAL	TESTS	HR OPE	R900
FARA OR STEP NO.	PROCEDURE STEP		RECORD DATUM/	
2.4	Using an oscilloscope confirm that the output of test point J20-1 "SLC 1 Integrator" corresponds to Figure 4.11A.	Fig. 4.11A	<u></u>	(√)
2.5	Using an oscilloscope confirm that the output of J20-2 "SLC 1 Torquer Current" corresponds to Figure 4.11B. Note make and fuse	Fig. 4.11B	5.9 \ 1.4 \ 2.54pe	ik (Abig)
2.6	Using an oscilloscope confirm that the output of J20-3 "SLC 1 Switch Tach" corresponds to Figure 4.11C.	Fig. 4.11C		(/)
3.	SLC #1 Off/SLC #2 On		•	
3.1	Execute command:			
1	SCAN LINE CORRECTOR 2 ON/1 OFF.	4B		(/)
3.2	Verify via the CRT that digital			,
	Word G bit 0 = 0			(√)
	bit 1 = 1.			(√)
3.3	Verify via the CRT that analog telemetry			
	Channel 45 "SLC 2 Drive Current" is 2.5 ± 2.5V.*	2.5 ± 2.5*	3.24	volts
	Channel 48 "SLC 2 ± 15V" 1s 2.5 ± 0.3V.	2.5 ± 0.3	2.44	volts
	Channel 49 "SLC 2 ÷ 5V" 1s 2.5 ± 0.1V.	2.5 ± 0.1	2.48	volts
	* Waveform is a sawtooth shown in figure 4.115			

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E. M.	MODULE UNIT TEST	SIZE	11323	16704
		SCALE	SEA C	SHEET

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DATA SHEET NO. _ OF 3

PARAGRAPH NO. 4.11

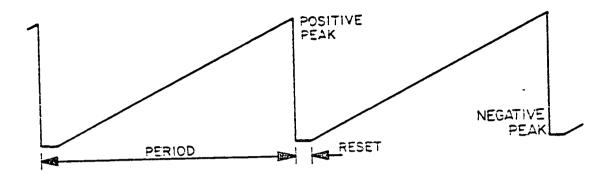
DETAILED FUNCTIONAL TESTS

LOG AHR OPER 900 PARA SPEC RECORD OR. UNITS PROCEDURE STEP OR DATUM / STEP COMMAND VERIFY NO Using an oscilloscope confirm that the 3.4 output of J20-4 "SLC 2 Integrator" (V) Fig. 4.11A corresponds to Figure 4.11A. 3.5 Using an oscilloscope confirm that the output of J20-5 "SLC 2 Torquer Current" corresponds to Figure 4.113. Nute peak amplitude 3.2 Fig. 4.11B (He) Using an oscilloscope confirm that the 3.5 output of J20-6 "SLC 2 Switch Tach" (V) Fig. 4.11C corresponds to Figure 4.11C. SLC #1 Dff/SLC #2 Off 4. 4.1 Execute command: 1 **(/)** 4C SCAN LINE CORRECTORS OFF. 4.2 Verify via the CRT that digital (1) Word G bit 0 = 0(1) bit 1 = 0.4.3 Verify via the CRT that analog telemetry 2.00 < 0.1 rolts Channel 44 is zero. < 0.1 Channel 45 is zero. 5.50 rolts 0.02 Channel 46 is zero. < 0.1 velts 0.02 < 0.1 Channel 47 is zero. volts < 0.1 Channel 48 is zero. 0.00 volts < 0.1 0.02 rolts Channel 49 is zero.

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E.M. MODULE UNIT TEST	S.EE	11323	16704
	SCALE	+ REV 2	, SHEET = = =

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PERIOD 71 mS ±3% RESET 5.12 mS ±3%

NOTE: 3% IS THE OSCILLOSCOPE'S ACCURACY. ACTUAL ACCURACY IS BETTER THAN 1%.

NEGATIVE PEAK -2V ±0.5V POSITIVE PEAK +2V ±0.5V

FIGURE 4.11A

SIZE	CODE IDEN	T NO.	NUMBER		
А	1132	23		167	04
 SCALE		REV	٥	SHEET	

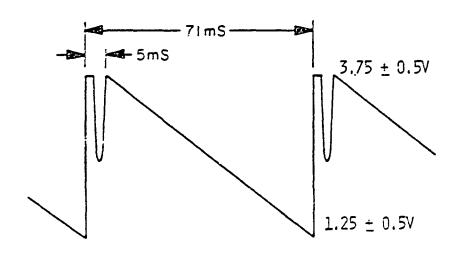


FIGURE 4.118

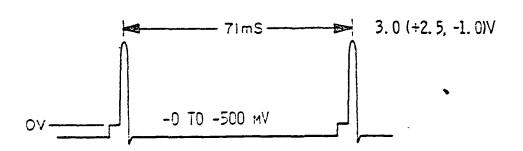


FIGURE 4.11C

SIZE	CODE IDENT NO.	HUMBER	
Α	11323	16704	
SCALE	REV	SHEET &	

DATA SHEET NO. 1 OF 3

PARAGRAPH NO. 4.12

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1000

		LUG A	HR UPE	K_7000
PARA OR STEP NO	PROCEDURE STEP	OR COMMAND	RECORD DATUM / VERIFY	
(4.12)	Note: In Order To Perform This Test Boards A06(50916) & A07(51398) Must Be Installed. CAL SHUTTER CONTROL TEST Confirm that test cable 45 is connected between			
	J45 on the electronics module and TJ45 on the Function Test Panel.		<u> </u>	8
	Connect test cable 20 and its breakout box to J20 on the Electronics Module.		~	(∿)
2.	MAIN SHUTTER ON/BACKUP SHUTTER OFF			
2.1	Execute Commands: SHUTTERS OFF. CAL SHUTTER ON/BACKUP	F	<u> </u>	(4)
	SHUTTER OFF/DC RESTORE NORMAL SELECT.	פ	V	(4)
2.2	Verify via the CRT that digital Word G bit 2 = 1 bit 5 = 0.		<u> </u>	(4) (4)
2.3	Use TLMT Scan Mode (XBCOO) Wait one minute, then verify that digital Word G bit 3 = 1		V	(4)
	bit 4 = 1.			(4)
2.4	Using an oscilloscope, Verify relationship of the following test points as shown in Figure 4.12a			
	J20-23 "7 Hz Test" J20-24 "DC Restore Sync Signal" J20-25 "16° Signal" J20-26 "0° Signal"			\$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$
	Using an oscilloscope, verify that test point J20-28 "Motor (+) Test" is toggling between gND and 28 VDC and that J20-29 "Motor (-) Test" is toggling between gND and 28 TDC. Frequency or period is indeterminant.			(/) (/)

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E. M.	MODULE	UNIT	TEST	Size	1132	3	ngEP	16704	
				SCALE	!	3EA	<u></u>	SHEET 58	

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DATA SHEET NO. 2 OF 3

PARAGRAPH NO. 4.12

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1000

L			LUG A	ULE OF E	~ _
	PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
	2.5	Using a DVM record test point J20-27 (re: A26 E04). "Amplitude Error" reading		2.5	VDC
		Verify that a TTL "1" level signal is at test points J20-30 "Phase Unlock Test," and J20-31 "Amplitude Unlock Test."	> 2.4 > 2.4	40	VDC(~)
		After lock-up, jumper J20-32 to J20-51 and verify that J20-28 goes to 13 VDC (± 3) and that word G bit 3=0, bit 4=0.		15120	(-)
	3.	MAIN SHUTTER OFF/BACKUP SHUTTER ON			
	3.1	Execute command: BACKUP SHUTTER ON/ CAL SHUTTER OFF/ DC RESTORE BACKUP SELECT.	E		(1)
A	3.2	Verify via the CRT that digital Word G bit $2 = 0$ bit $5 = 1$.		<u> </u>	(4)
	3.3	Wait three minutes, then verify that digital Word G bit 6 = 1			(4)
	3.4	Using an oscilloscope.			
		Verify relationship of the following test points as shown in Figure 4.12b. J20-34 "7Hz Test" J20-35 "DC Restore Sync Signal" J20-36 "13° Signal" J20-37 "0° Signal".		\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	(3) (4) (3)
	3.5	Using a DVM, record test point J20-38 (ret A26 E04) "Amplitude Error" reading	·	.01	סכד

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E. M.	MODULE	UNIT	TEST	Size A	11323	NUMBER	16704	
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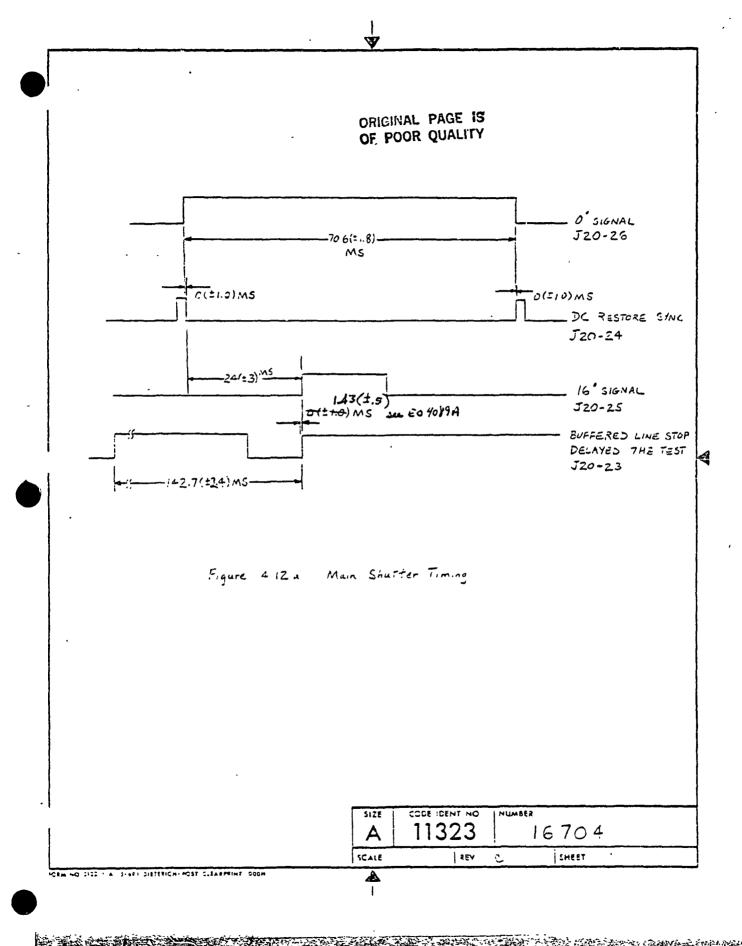
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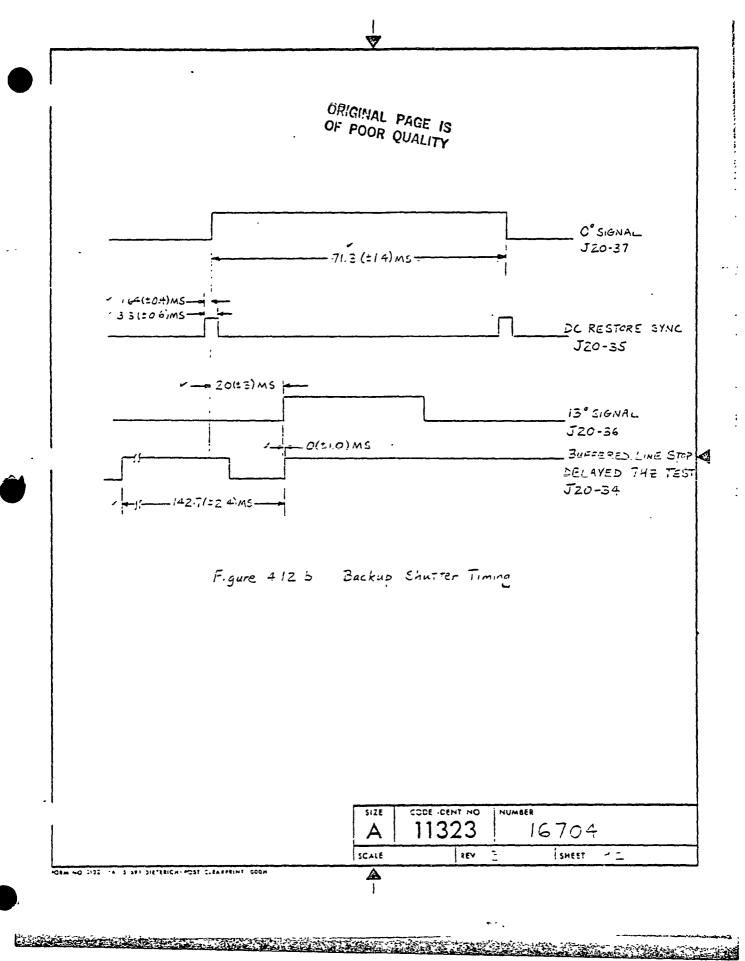
DATA SHEET NO. 3 OF 3 4.12 PARAGRAPH NO. _ DETAILED FUNCTIONAL TESTS LOG AHR OPER 1000 PARA OR SPEC RECORD PROCEDURE STEP UNITS OR DATUM / STEP COMMAND VERIFY (contd) Verify that a TTL level signal is at test points J20-39 "Phase Unlock Test (I) VDC >2.4 J20-40 "Amplitude Unlock Test" (4) ADC >2.4 4. BOTH SHUTTERS OFF 4.1 Execute command: SHUTTERS OFF. (4) 4.2 Verify via the CRT that digital Word G bit 2 = 0(1) (4) bit 3 = 0ŗ (4) bit 4 = 0 bit 5 = 0(i) (4) bit 6 = 0bit 7 = 0. (4) $\langle \underline{\psi} \rangle$ ORIGINAL PAGE IS OF POOR QUALITY 1/2/52 .EST ENGINEER. DATE QA SIZE CODE IDENT 140. 16704 11323 E.M. MODULE UNIT A

GEM NG 2122 A E SET DIETERICHT-MOST CLEARPEINT GOOM

SCALE

SHEET





DATA SHEET NO. 1 OF 6 PARAGRAPH NO. 4.14

DETAILED FUNCTIONAL TESTS

		LOG A	HR OPE	7 800 j
PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(4.14)	Note: In Order To Perform This Test Board A08(51402) Must Be Installed. FUSIBLE LINK TEST			
1.	WARNING: When the Electronics Module is linked to Radiometer hardware shutter fusible link switch closure commands and cooler door fusible link switch closure commands shall not be transmitted if the flight plug (P14) is installed. Note that J+3 is connected to Function	ORIGINAL PAG OF POOR QUA		- · ·
	Test Pinel. Install plug P14.			(√)
	Connect a DVM across the Cooler Door Fusible Link Test Points.			(√)
	Connect a DVM across the Main Shutter Fusible Link T?'s.			(V)
ì	Set both DVM's to read in the 20V range.			(√)
.2.	All Fusible Link Switches Open			
2.1	Execute command:			
	FUSIBLE LINK SWITCHES OPEN	60	<u> </u>	
2.2	Verify via the CRT that digital			,
	Word A bit 5 = 0			(1)
	bit 6 = 0		<u></u>	(1)
	bit 7 = 0			(1/)
	Word C bit 5 = 0			(1)
	51c 6 = 0			
	bit 7 = 0.			(√)
	<u> </u>		<u> </u>	!

EST ENGINEER Jam		DATE 15 Dec 18	<u> </u>
E.M. MODULE UNIT TEST	SIZE	11323	16704
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PARAGRAPH NO. 4.14

DETAILED FUNCTIONAL TESTS

LOG AHR OPER foo PARA SPEC RECORD OR **UNITS** PROCEDURE STEP OR DATUM / I STEP COMMAND VERIFY NO Verify that the voltage across the Cooler 2.3 Door Fusible Link TP's is ≤10 mV, and that the voltage across the Main Shutter 0.0 ≤10 nvolts Fusible Link TP's is \$10 mV. Cooler Door Fusible Link Switch A Closed 3. 3.1 Execute command: COOLER DOOR FUSIBLE LINK $\langle \checkmark \rangle$ SWITCH A CLOSE. 5A 3.2 Verify via the CRT that digital (V) Word C bit 5 = 11/5 1 bit 6 = 0(1) V bit 7 = 0(V) Word A bit 5 - 0 (V) bit 6 = 0 $(\sqrt{})$ bit 7 = 0. 3.3 Verify that the voltage across the Cooler Door Fusible Link TP's and across the 0.00 Main Shutter Fusible Link TP's is ≤10mV. ≤10 mvolts 0.00 4. Cooler Door Fusible Link Switches A and B Closed. 4.1 Execute commands: COOLER DOOR FUSIBLE LINK (J)5 A SWITCH A CLOSE. COOLER DOOR FUSIBLE LINK (1) 48 ~ SWITCH B CLOSE.

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E.M. MODULE UNIT TEST	SIZE A	11323	16704
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DETAILED FUNCTIONAL TESTS LOG AHR OPER CONTONAL TESTS LOG AHR OPER CONTONAL STEP PARA OR PROCEDURE STEP OR DATUM/ UNITS Verify via the CRI that digital Word c bit 5 - 1 bit 6 - 1 bit 7 - 0 Word A bit 5 - 0 bit 7 - 0. 4.3 Verify that the voltage across the Cooler Door Fusible Link TP's and across the Maio Shutcer Fusible Link TP's is 210 av. 5. All Cooler Door Switches Closed/Cooler Door Fusible Link Activated. Sult Cooler Door Fusible Link Switch A CLOSE. COOLER DOOR FUSIBLE LINK SWITCH A CLOSE. COOLER DOOR FUSIBLE LINK SWITCH A CLOSE. COOLER DOOR FUSIBLE LINK SWITCH A CLOSE. Sult Cooler Door Switches Closed/Cooler Door Switch CLOSE. COOLER DOOR FUSIBLE LINK SWITCH A CLOSE A CLOS		DATA SHEET NO. 3 OF 6	PARAGRAPH	NO 4.14					
PARA STEP PROCEDURE STEP PROCEDURE STEP PROCEDURE STEP SPEC OR COMMAND DATUM/ VERIFY UNITS (/) Word C bit 5 = 1 bit 6 = 1 bit 7 = 0 Word A bit 5 = 0 bit 7 = 0. 4.3 Verify that the voltage across the Cooler Door Fusible Link TP's and across the Mada Shutter Fusible Link TP's is \$10 mV. 5. All Cooler Door Systches Closed/Cooler Door Fusible Link Activated. 5.1 Execute Commands: COOLER DOOR FUSIBLE LINK SWITCH A CLOSE. COOLER DOOR FUSIBLE LINK SWITCH B CLOSE. COOLER DOOR FUSIBLE LINK SWITCH B CLOSE. COOLER DOOR FUSIBLE LINK SWITCH B CLOSE. SITE COOLER DOOR FUSIBLE LINK SWITCH B CLOSE. COOLER DOOR FUSIBLE LINK SWITCH B CLOSE. SITE COOLER DOOR FUSIBLE LINK SWITCH B CLOSE. COOLER DOOR FUSIBLE LINK SWITCH B CLOSE. COOLER DOOR FUSIBLE LINK SWITCH B CLOSE. SITE COOLER DOOR FUSIBLE LINK SWITCH B CLOSE. COOLER DOOR FUSIBLE LINK SWITCH B CLOSE. COOLER DOOR FUSIBLE LINK SWITCH B CLOSE. COOLER DOOR FUSIBLE LINK SWITCH B CLOSE. COOLER DOOR FUSIBLE LINK SWITCH B CLOSE. COOLER DOOR FUSIBLE LINK SWITCH B CLOSE. COOLER DOOR FUSIBLE LINK SWITCH B CLOSE. COOLER DOOR FUSIBLE LINK SWITCH B CLOSE. COOLER DOOR FUSIBLE LINK SWITCH B CLOSE. COOLER DOOR FUSIBLE LINK SWITCH B CLOSE. COOLER DOOR FUSIBLE LINK SWITCH B CLOSE. COOLER DOOR FUSIBLE LINK SWITCH B CLOSE. COOLER DOOR FUSIBLE LINK SWITCH B CLOSE. COOLER DOOR FUSIBLE LINK SWITCH B CLOSE. COOLER DOOR FUSIBLE LINK SWITCH B CLOSE. COOLER DOOR FUSIBLE LINK SWITCH B CLOSE. COOLER DOOR FUSIBLE LINK B CLOSE B	1								
STEP PROCEDURE STEP OR COMMAND VERIFY 4.2 Verify via the CRT that digital Word C bit 5 = 1 bit 6 = 1 bit 7 = 0 Word A bit 5 = 0 bit 7 = 0. 4.3 Verify that the voltage across the Cooler Door Fusible Link TP's and across the Main Shutter Fusible Link TP's is \$10 mV. 3. All Cooler Door Sytiches Closed/Cooler Door Fusible Link Activated. 5.1 Execute Commands: COOLER DOOR FUSIBLE LINK SHITCH A CLOSE. COOLER DOOR FUSIBLE LINK SHITCH C CLOSE. 5.2 Verify via the CRT that digital Word C bit 5 = 1 bit 6 = 1 bit 6 = 1 bit 6 = 1 bit 6 = 1 bit 7 = 1 DATE STEIL ON COMMENT OF A CLOSE SCALE SCALE STATE OF A CLOSE. E.M. MODULE UNIT TEST A 11323 NOW SEEL SHEET TO SM		DETAILED FUNCTIONAL		HR OPER	250D				
Word C bit 5 = 1 bit 6 = 1 bit 7 = 0 Word A bit 5 = 0 bit 6 = 0 bit 7 = 0. 4.3 Verify that the voltage across the Cooler Door Fusible Link TP's and across the Main Shutter Fusible Link TP's to \$10 mv. 5. All Cooler Door Systches Closed/Cooler Door Fusible Link Activated. 5.1 Execute Commands: COOLER DOOR FUSIBLE LINK SHITCH A CLOSE. COOLER DOOR FUSIBLE LINK SHITCH CLOSE. 5.2 Verify via the CRT that digital Word C bit 5 = 1 bit 6 = 1 bit 7 = 1 DATE STATE OA E.M. MODULE UNIT TEST A 11323 PAGMETER A 11323 PAGMETER SHEET TO	STEP	PROCEDURE STEP	OR	DATUM /	UNITS				
bit 6 = 1 bit 7 = 0 Word A bit 5 = 0 bit 6 = 0 bit 7 = 0. 4.3 Verify that the voltage across the Cooler Door Fusible Link TP's and across the Main Shutter Fusible Link TP's is \$10 mV. 5. All Cooler Door Switches Closed/Cooler Door Fusible Link Activated. 5.1 Execute Commands: COOLER DOOR FUSIBLE LINK SWITCH A CLOSE. COOLER DOOR FUSIBLE LINK SWITCH C CLOSE. COOLER DOOR FUSIBLE LINK SWITCH C CLOSE. 5.2 Verify via the CRT that digital Word C bit 5 = 1 bit 6 = 1 bit 7 = 1 DATE STENGINEER COOLER DOOR FUSIBLE LINK SWITCH C CLOSE. SCALE SEED ON MALES SCALE SHEET SEED	4.2	Verify via the CRT that digital			-				
bit 7 = 0 Word A bit 5 = 0 bit 6 = 0 bit 7 = 0. 4.3 Verify that the voltage across the Cooler Door Fusible Link TP's and across the Main Shutter Fusible Link TP's is \$10 mV. 5. All Cooler Door Switches Closed/Cooler Door Fusible Link Activated. 5.1 Execute Commands: COOLER DOOR FUSIBLE LINK SWITCH A CLOSE. COOLER DOOR FUSIBLE LINK SWITCH C CLOSE. COOLER DOOR FUSIBLE LINK SWITCH C CLOSE. 5.2 Verify via the CRT that digital Word C bit 5 = 1 bit 6 = 1 bit 7 = 1 DATE STENGINEER COOLER DOOR FUSIBLE LINK SWITCH C CLOSE. SEALE SEALE SEALE SHEET SALES SEA		Word C bit 5 = 1			(√)				
Word A bit 5 = 0 bit 6 = 0 bit 7 = 0. 4.3 Verify that the voltage across the Cooler Door Fusible Link TP's and across the Main Shutter Fusible Link TP's is \$10 mV. 5. All Cooler Door Switches Closed/Cooler Door Fusible Link Activated. Execute Commands: COOLER DOOR FUSIBLE LINK SWITCH A CLOSE. COOLER DOOR FUSIBLE LINK SWITCH 3 CLOSE. COOLER DOOR FUSIBLE LINK SWITCH C CLOSE. 5.2 Verify via the CRT that digital Word C bit 5 = 1 bit 6 = 1 bit 7 = 1 DATE STATE OR SUMBER A 11323 16704 E.M. MODULE UNIT TEST A 11323 16704		bit 6 = 1			(V)				
bit 6 = 0 bit 7 = 0. 4.3 Verify that the voltage across the Cooler Door Fusible Link TP's and across the Main Shutter Fusible Link TP's is \$10 mV. 5. All Cooler Door Switches Closed/Cooler Door Fusible Link Activated. 5.1 Execute Commands: COOLER DOOR FUSIBLE LINK SWITCH A CLOSE. COOLER DOOR FUSIBLE LINK SWITCH A CLOSE. COOLER DOOR FUSIBLE LINK SWITCH C CLOSE. 5.2 Verify via the CRT that digital Word C bit 5 = 1 bit 6 = 1 bit 7 = 1 DATE STAIT! QA E.M. MODULE UNIT TEST A 11323 NUMBER SCALE SEEV SMEET TO		bit 7 = 0			(J)				
bit 7 = 0. 4.3 Verify that the voltage across the Cooler Door Fusible Link TP's and across the Main Shutter Fusible Link TP's is \$10 mV. 5. All Cooler Door Switches Closed/Cooler Door Fusible Link Activated. 5.1 Execute Commands: COOLER DOOR FUSIBLE LINK SWITCH A CLOSE. COOLER DOOR FUSIBLE LINK SWITCH 3 CLOSE. COOLER DOOR FUSIBLE LINK SWITCH C CLOSE. 5.2 Verify via the CRT that digital Word C bit 5 = 1 bit 6 = 1 bit 6 = 1 bit 7 = 1 DATE STENGINEER A 11323 NAME COOLER TOO NUMBER A 16704 SCALE NEW C SMEET OF		Word A bit 5 = 0			(1)				
4.3 Verify that the voltage across the Cooler Door Fusible Link TP's and across the Main Shutter Fusible Link TP's is \$10 mv. 5. All Cooler Door Switches Closed/Cooler Door Fusible Link Activated. 5.1 Execute Commands: COOLER DOOR FUSIBLE LINK SWITCH A CLOSE. COOLER DOOR FUSIBLE LINK SWITCH 3 CLOSE. COOLER DOOR FUSIBLE LINK SWITCH 3 CLOSE. COOLER DOOR FUSIBLE LINK SWITCH COLOSE. 5.2 Verify via the CRT that digital Word C bit 5 = 1 bit 6 = 1 bit 6 = 1 bit 7 = 1 DATE STACK QA E.M. MODULE UNIT TEST A 11323 NUMBER 16704 SCALE 18EV 2 SHEET 23		bit 6 = 0			. 1				
Door Fusible Link TP's and across the Main Shutter Fusible Link TP's is \$10 mV. 5. All Cooler Door Switches Closed/Cooler Door Fusible Link Activated. 5.1 Execute Commands: COOLER DOOR FUSIBLE LINK SWITCH A CLOSE. COOLER DOOR FUSIBLE LINK SWITCH 3 CLOSE. COOLER DOOR FUSIBLE LINK SWITCH C CLOSE. 5.2 Verify via the CRT that digital Word C bit 5 = 1 bit 6 = 1 bit 7 = 1 DATE COLORER OA E.M. MODULE UNIT TEST A 11323 DATE STALL INVAMENT AND NUMBER A 16704		bit 7 = 0.		<u> </u>	(\(\sigma \)				
Door Fusible Link Activated. Execute Commands: COOLER DOOR FUSIBLE LINK SWITCH A CLOSE. COOLER DOOR FUSIBLE LINK SWITCH B CLOSE. COOLER DOOR FUSIBLE LINK SWITCH C CLOSE. 5.2 Verify via the CRT that digital Word C bit 5 = 1 bit 6 = 1 bit 7 = 1 DATE SACIFI QA E.M. MODULE UNIT TEST A 11323 I6704	4.3	Door Fusible Link TP's and across the	≤10	0.0 	mvolts				
COOLER DOOR FUSIBLE LINK SWITCH A CLOSE. COOLER DOOR FUSIBLE LINK SWITCH 3 CLOSE. COOLER DOOR FUSIBLE LINK SWITCH C CLOSE. 5.2 Verify via the CRT that digital Word C bit 5 = 1 bit 6 = 1 bit 7 = 1 DATE (C) CODE ODER TOO NUMBER A 11323 IG704	5.	All Cooler Door Switches Closed/Cooler Door Fusible Link Activated.							
SWITCH A CLOSE. COOLER DOOR FUSIBLE LINK SWITCH B CLOSE. COOLER DOOR FUSIBLE LINK SWITCH C CLOSE. 5.2 Verify via the CRT that digital Word C bit 5 = 1 bit 6 = 1 bit 7 = 1 DATE STELLY QA E.M. MODULE UNIT TEST A 11323 SCALE SHEET 12 SHEET 12	5.1	Execute Commands:							
SWITCH 3 CLOSE. COOLER DOOR FUSIBLE LINK SWITCH C CLOSE. 5.2 Verify via the CRT that digital Word C bit 5 = 1 bit 6 = 1 bit 7 = 1 DATE STATE OF NUMBER E.M. MODULE UNIT TEST A 11323 16704			5A		(J)				
SWITCH C CLOSE. 5.2 Verify via the CRT that digital Word C bit 5 = 1 bit 6 = 1 bit 7 = 1 DATE STENGINEER OA E. M. MODULE UNIT TEST A 11323 NUMBER 16704			48		(V)				
Word C bit 5 = 1 bit 6 = 1 bit 7 = 1 DATE SECURITY QA E.M. MODULE UNIT TEST A 11323 16704			5 C		()				
EST ENGINEER DATE SIZE CODE DENT NO NUMBER SIZE CODE DENT NO NUMBER 16704 SCALE TREV SHEET 3	5.2				,				
EST ENGINEER Sour DATE SIZE CODE IDENT NO INUMBER E. M. MODULE UNIT TEST A 11323 16704									
EST ENGINEER DATE 15 D					. 1				
E.M. MODULE UNIT TEST SIZE CODE IDENT NO NUMBER 16704		bit 7 = 1			()				
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	E. M.			16704					
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DATA SHEET NO. 4 OF 6

PARAGRAPH NO. 4.14

DETAILED FUNCTIONAL TESTS

		LOG A	HR OPER	7 500
PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	
(5.2)	Word A bit 5 = 0			(V)
	bit 6 = 0			(√)
	bit 7 = 0.			(1)
5.3	Verify that the Cooler Door Fusible Link Sonalert is switched to the Alarm position and is sounding (it may be turned off after verification). Verify that the indicator LED is lit.			. (√)
5.4	Verify that there is 1.5V (+20%) across the Cooler Door Fusible Link TP's.	1.5 <u>+</u> 0.5	1.15	volts
5.5	Verify that there is ≤10 mV across the Main Shutter Fusible Link TP's.	≤10		avolts
, ≥1 6.	Reset all Switches. Repeat 4.14.2.			(√)
7.	Shutter Fusible Link Switch A Closed.			
7.1	Execute command:			
	SHUTTER FUSIBLE LINK SWITCH A CLOSE.	۵ 5		(√)
7.2	Verify via the CRT that digital			
	Word A bit 5 = 1			(1)
	bit 6 = 0			(V)
	bit 7 = 0		v	(V)
	Word C bit 5 = 0			(V)
	bit 6 = 0			(1)
	bit 7 = 0.	•		(√)

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E.M. MODULE UNIT TEST	A 11323 NUMBER 16704
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DATA SHEET NO. 5 OF 6 PARAGRAPH NO. 4.14

DETAILED FUNCTIONAL TESTS

	DETAILED FUNCTIONAL	LOG A	HR OPE	for
PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	
7.3	Verify that the voltage across the Cooler Door Fusible Link TP's and across the Main Shutter Fusible Link TP's is ≤10mV. Shutter Fusible Link Switches A and 3	≤10	0.0	mvolts
8.1	Closed. Execute commands:			
	SHUTTER FUSIBLE LINK SWITCH A CLOSE.	5 D	V	(/)
	SHUTTER FUSIBLE LINK SWITCH B GLOSE.	49		(1)
8.2	Verify via the CRT that digital			,
۱ م	Word A bit 5 = 1			(√)
	bir 6 = 1		<u> </u>	(V)
	bit 7 = 0			(V) (V)
	Word C bit 5 = 0 bit 6 = 0		<u></u>	(V)
	bit 7 = 0.			(\(\sigma \)
8.3	Verify that the voltage across the Cooler Door Fusible Link TP's and the Shutter Fusible Link TP's are ≤10 mV.	≤10	0.0	mvolts
9.	All Shutter Switches Closed/Shutter Fusible Link Activated.			
9.1	Execute Commands:			
	SHUTTER FUSIBLE LINK SWITCH A CLOSE.	. 5D		(V)

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E. M.	MODULE	UNIT	TEST	SIZE A	11323	NUMBER	16704
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DATA SHEET NO. 5 OF 5 PARAGRAPH NO. 4.14							
	DETAILED FUNCTIONAL	TESTS LOGA!	HR OPER	i soo			
PARA OR STEP NO.	PROCEDURE STEP		RECORD DATUM/				
(9.1)	SHUTTER FUSIBLE LINK SWITCH B CLOSE.	49		(√)			
	SHUTTER FUSIBLE LINK SWITCH C CLOSE.	5 F		(1)			
9.2	Verify via the CRT that digital						
	Word A bit 5 = 1			(J)			
	bit 6 = 1			(1)			
	bit 7 = 1			(√)			
	Word C bit 5 = 0			(√)			
1	51t 6 - 0		<u>_v</u>	(1/)			
1	bit 7 = 0.		<u></u>	(y')			
9.3	Verify that the Shutter Fusible Link Sonalert is switched to the Alara position and is sounding. Verify that the indicator LED is lit.		V_	(J)			
9.4	Verify that there is 1.5 v(*20%) across the Shutter Fusible Link TP's.	1.5 = 0.5	1.4%	volts			
9.5	Verify that there is ≤10mV across the Cooler Door Fusible Link TP's.	≤10		nvolts			
10.	Reset. Repeat J.14.2.			(1)			
11.	Remove plug ?14.			(V)			
		<u> </u>					
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PARAGRAPH NO. 4.15

DETAILED FUNCTIONAL TESTS

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LOG AHR OPER SON PARA SPEC RECORD OR. OR DATUM / UNITS PROCEDURE STEP SŤÈP COMMAND VERIFY NO Note: in Order To Perform This Test Board (4.15)A08(51402) Must Be Installed. BAFFLE HEATER TEST 1. Confirm that test cable 44 is properly connected between the Electronics Module and the Function Test Panel. Connect test cable 20 and its breakout box to J20 on the Electronics Module. 2. In order to simulate the Baffle Heater Controller thermistor, connect Decade Resistor #1 across the Baffle Heater Input Test Points on the Function Test Panel. Set DR #1 at 05000 ohms ("hot"). To simulate the Baffle Temp Sansor thermistor connect Decade Resistor #2 across TP's 4 and 10 on the Function Test Panel. Set DR #2 at 05000 ohms ("hot"). To measure Baffle Heater Current connect ٠. a DVM across the Baffle Heater current Test Points on the Function Test Panel. The output will be measured in volts, with a scaling of 1 V indicating a 1 A (V) current flow. 4. Heater and Backup Off. Execute command: BAFFLE HEATER CONTROLLER 4.1 56 (\) OFF/BACKUP OFF. 4.2 Verify via the CRT that digital Word F bit 0 = 0 bit 1 = 0. (\ 4.3 Verify that the baffle heater current is \leq 1 mA (\leq 1 mV reading on the DVM). 0.0 ≤1 mvolts Verify that analog telemetry
Channel 54 "Baffle Hoater Current" <1.0 0.0 volts is ≤ 1.0 V.

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DATA SHEET NO. 2 OF 4

PARAGRAPH NO. 4.15

DETAILED FUNCTIONAL TESTS

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	PARA OR STEP NO.	PROCEDURE STEP		RECORD DATUM/	
;	5.	Baffle Heater Controller On.			
	5.1	Execute commands: TELEMETRY SCALING ON. BAFFLE HEATER CONTROLLER	7		()
,.		OFF/ BACKUP OFF.	56	<u>~</u>	(\)
<i>‡</i>		BAFFLE HEATER CONTROL ON	是火鱼	<u> </u>	(1)
-	5.2	Verify via the CRT that Digital Word F bit 0 = 1	54 is CHANT	<u>~</u>	(v)
:		bit 1 = 0.			(,)
	5.3	Verify that the baffle heater current DVM is measuring <1 mV.	<u><</u> 1	<u> </u>	nvolcs
: Þ	5.4	Using a DVM verify that test point J20-41 "Baffle Temp Error Test" is in the range O <v<1v.< th=""><th>0<v<1< th=""><th>0.0</th><th>volts</th></v<1<></th></v<1v.<>	0 <v<1< th=""><th>0.0</th><th>volts</th></v<1<>	0.0	volts
		Using a DVM verify that test point J20-42 "Baffle Heater Current Test" is in the range O <v<.1v.< th=""><th>0<V<.1</th><th>0.0</th><th>volts</th></v<.1v.<>	0 < V <.1	0.0	volts
:	5.5	Set DR #1 at 30000 ohms ("cold").		~	(1)
		Verify that the baffle heater current DVM is reading ≥ 300 mV.	<u>></u> 300	<u>505</u>	nvolts
;		Verify that analog telemetry Channel 54 is \geq 2.5V.	<u>≥</u> 2.5	5.1	volts
	5.6	Using a DVM verify that test point J20-41 is in the range 2 <v<15v.< th=""><th>2≪V<15</th><th>4.64</th><th>volts</th></v<15v.<>	2≪ V <15	4.64	volts
		Verify that test point J20-42 is in the range 0.2 <v<1v.< th=""><th>. 2<7<1</th><th>1661</th><th>volts</th></v<1v.<>	. 2<7<1	1661	volts
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	DATA SHEET NO. 1 OF 1	PARAGRAPH	NO. 4.15	
	DETAILED FUNCTIONAL		HR OPER	7 Son
PARA OR STEP NO.	PROCEDURE STEP		RECORD DATUM /	
6.	Heater and Backup On.			
6.1	Execute commands: BAFFLE HEATER CONTROLLER OFF/			
	OFF/BACKUP OFF.	56		(1)
	BAFFLE HEATER CONTROL ON	54	<u></u>	(\lambda \)
	BAFFLE HEATER BACKUP ON.	55		(/)
6.2	Verify via the CRT that digital Word F bit 0 = 1		<u></u>	(1/)
	bit 1 = 1.			(v)
6.3	Verify that the baffle current DVM is measuring ≥ 300 mV.	• ≥300	340	mvolts
	Verify that analog telemetry Channel 54 is ≥ 2.5 V.	<u>≥</u> 2.5	3.94	volts
7.	Reset/Controller On.			
7.1	Execute commands: BAFFLE HEATER CONTROLLER OFF/			
	BACKUP OFF.	56		(\)
	BAFFLE HEATER CONTROL ON	5 4		(,)
7.2	Verify via the CRT that digital Word F			,
	bit 0 = 1	,		(v′)
	bit 1 = 0.			(',)
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PARAGRAPH NO. 4.15

DETAILED FUNCTIONAL TESTS

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PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
8.	Baffle Temperature Telemetry.	-		
3.1	Execute command:DC RESTORE OFF/TELEMETRY SCALING OFF.	6		(v)
8.2	Verify via the CRT that analog telemetry Channel 69 "Baffla Temperature" is ≤ 1.0 V.	<u>≤</u> 1.0	0.0	volts
8.3	Execute command: TELEMETRY SCALING ON.	7		(v)
3.4	Verify that analog telemetry Channel 69 is $\geq 2.5V$.	<u>≥</u> 2.5	5.04	volts
8.5	Reset DR #2 to 30000 ohms ("cold").			(v)
	Verify that analog telemetry Channel 69 is ≤ 1.0 V.	<u><</u> 1.0	-440	volts
9.	Baffle Heater Off/Backup Off.		,	
9.1	Exacute commands:			
	BAFFLE HEATER CONTROLLER OFF/ BACKUP OFF. DC RESTORE OFF/TELEMETRY SCALING OFF.	56		(v)
		6		(v')
9.2	Verify via the CRT that digital Word F			(V)
	61t 1 = 0			(V)
	Word L bit 2 = 0.		V	(',)
9.3	Verify that the baffle current DVM is measuring ≤ 1 mV.	<u><</u> 1 mV.	00 1/2	nvolts
	Verify that inalog telemetry Channel 54 is ≤1.0V.		٥.٥	volts

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PARAGRAPH NO. 4.18

DETAILED FUNCTIONAL TESTS

	DETAILED TONGTIONAL	LOGA	HR OPER	1000
PARA OR STEP NO.	PROCEDURE STEP		RECORD DATUM / VERIFY	
(4.18)	LVDT POWER CONTROL	-		
1.	Confirm that test cable 46 is connected properly between the Electronics Module and the Function Test Panel (FTP).		<u></u>	(/)
2.	LVDT Power Check.			
2.1	Execute command: LVDT POWER OFF. LVDT POWER ON	5 E 5 B	<u> </u>	
2.2	Verify via the CRT that digital			
	Word E bit 1 = 1.			(~)
2.3	Connect a DVM between LVDT Power 1 TP and LVDT Return TP on the FTP.		<u>/</u>	(V)
	Confirm that the DVM measures +15(±0.3)VDC	14.7 ≤V≤15.3	15.0 1	ADC
2.4	Connect a DVM between LVDT Power 2 TP and LVDT Return TP on FTP.			(V)
	Confirm that the DVM measures +15(-0.3)VDC	14.7 SVS15.3	15.00	VDC
2.5	Connect a DVM between LVDT Power 3 TP and LVDT Return TP on FTP			(~)
	Confirm that the DVM measures +15(=0.3) VDC	14.7 ≤V≤15.3	15.00	⊅DC
2.6	Execute command:			
	LVDT POWER OFF.	5 E		(~)
2.7	Verify via the CRT that digital			
	Word E bit 1 = 0.			(/)

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E. M.	MODULE	UNIT	TEST	Size	11323	NUMBER	16704	
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DATA SHEET NO. _2 OF _3

PARAGRAPH NO. 4.18

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1000 PARA SPEC RECORD OR OR UNITS PROCEDURE STEP DATUM / STEP COMMAND **VERIFY** NO 2.8 Repeat subparagraphs 2.3 to 2.5 and confirm the following DVM measurement: 2.3: 0(±0.1) VDC 00 VDC $-0.1 \le V \le 0.1$ -0.1 < V ≤ 0.1 VDC 2.4: 0(±0.1)VDC 0.0 2.5: 0(±0.1)VDC $-0.1 \le y \le 0.1$ 0.0 1/ VDC LVDT #1 Output Buffer Check. 3. 3.1 Execute command: LVDT POWER ON 5B (1) 3.2 Verify via the CRT that digital (\checkmark) Word E bit 1 = 1. D 3.3 Connect the Power Design 2005 voltage reference between LVDT Output 1 TP and LVDT Return (V) 3.4 Request analog telemetry Channel 56 "Inchworm 1 position" on CRT. (r) 3.5 With voltage reference adjusted for -1.50(±0.20) VDC input, verify that analog .08 telemetry channel 56 output reads -0.20≤V≤0.6d 0.20(±0.40) VDC. DCV 3.6 With voltage reference adjusted for $0.00(\pm 0.20)$ VDC input, verify that 2.58 channel 56 output reads $2.50(\pm0.40)$ VDC. 2.10≤V≤2.90 VDC 3.7 With voltage reference adjusted for 1.50(±0.20)VDC input verify that 1.96 4.60 \SV \S.40 channel 56 output reads 5.00(±0.40)VDC. VDC

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E.M. MODULE UNIT TEST	Size	11323 NUMB	16704
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DATA SHEET NO. 3 OF 3

PARAGRAPH NO. 4.18

DETAILED FUNCTIONAL TESTS

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PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	
4.0	LVDT #2 Output Buffer Check.			
4.1	Reset voltage reference to 0.0(±0.20)VDC, remove it from LVDT Output 1 TP, and connect it to LVDT Output 2 TP.	· .		(J) ·
4.2	Request analog telemetry Channel 57 "Inchworm 2 position" on CRT.			(V)
4.3	Repeat subparagraphs 3.5 to 3.7 and verify that Channel 57 outputs read as follows			
	3.5: 0.20(±0.40) VDC	-0.20≤v≤0.60	0.06	VDC
	3.6: 2.50(±0.40) VDC	2.10≤₹≤2.90	2.58	VDC .
	3.7: 5.00(±0.40) VDC.	4.60≤V≤5.40	2.08	VDC
,	LVDT /3 Output Buffer Check.			
5.1	Reset voltage reference to 0.0(±0.20)VDC, remove it from LVDT Output 2 TP, and connect it to LVDT Output 3 TP.			· · (√)
5.2	Request analog telemetry Channel 58 "Inchworm 3 position" on CRT.			(√)
5.3	Repeat subparagraphs 3.5 to 3.7 and verify that Channel 58 outputs read as follows		•	
	3.5: 0.20(±0.40) VDC	-0.20≤v≤0.60	0.06	ADC
	3.6: 2.50(±0.40)VDC	2.10≤V≤2.90	z.58	VDC
	3.7: 5.00(±0.40)VDC.	4.60≤₹≤5.40	4.94	VDC
6.	Reset.			,
6.1	Execute command: LVDT POWER OFF	5E	<u> </u>	(√)
6.2	Verify via the CRT that digitalWord E bit 1 = 0.	•	\	(J ₂

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E. M.	MODULE	UNIT	TEST	SIZE	1132		NUMBER	16704
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